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A Gentleman's Gee Bee...

...Haffke's Model-Y

MODEL AIRPLANE NEWS

August 1998 • Volume 126, Number 8


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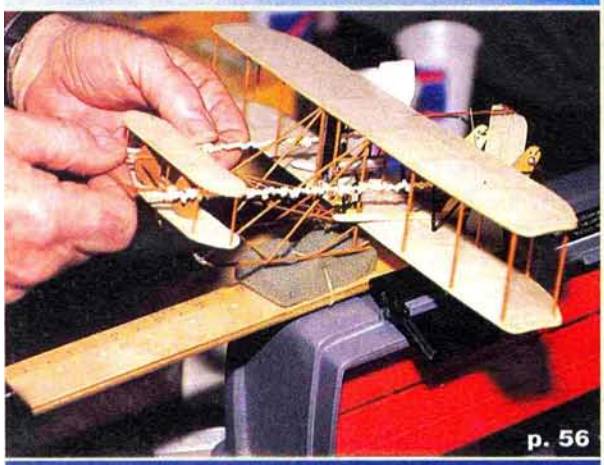
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ON THE COVER: Dean DiGiorgio flies Dino DiGiorgio's Fiberclassics Spitfire for the camera. Inset: Roy Vaillancourt took second place in Designer Scale at this year's Top Gun. Inset strip, left to right: some of the great planes at Top Gun '98 were Kerry Sterner's Vampire, Tad Krzanowski's Lim-6bis and Mark Frankel's T-34. Bottom: Henry Haffke shares his latest design, a Gee Bee Model-Y.

On this page (top to bottom): Brian O'Meara's Sea Fury in flight at Top Gun '98; this little marvel was a hit at the Buffalo indoor free flight meet; the Kyosho Aurum Sports 30 ARF.

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Construction

Columns

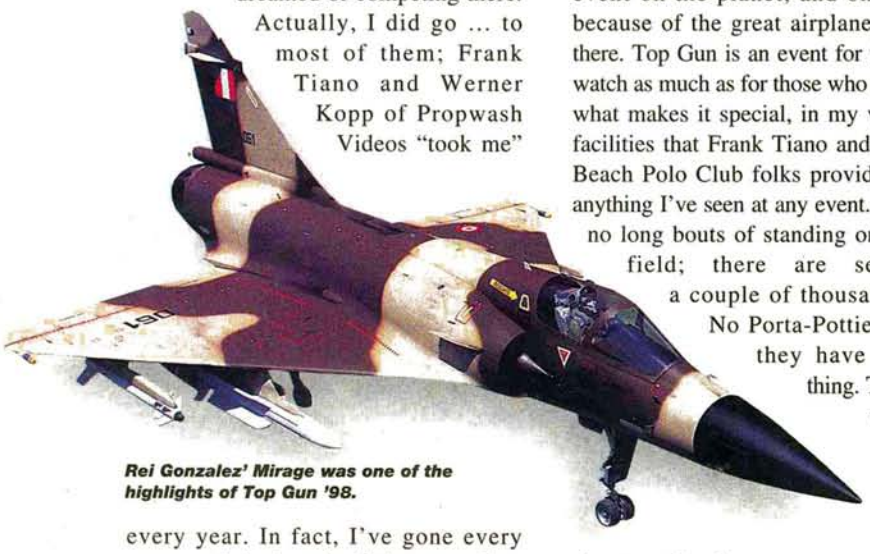
Departments

EDITORIAL

by LARRY MARSHALL

EXCELLENCE IN SCALE

DID YOU EVER DREAM of going to Top Gun? If you like scale models, there's a good chance that you have. Before I came to *Model Airplane News*, I used to dream of going as a spectator and, when my imagination overcame reality, I even dreamed of competing there. Actually, I did go ... to most of them; Frank Tiano and Werner Kopp of Propwash Videos "took me" every year. In fact, I've gone every year a whole bunch of times, as I've watched those videos over and over, each time gleaning just a bit more information about the scale models that fly there, the pilots who fly them, and about building and flying scale models.



Rei Gonzalez' Mirage was one of the highlights of Top Gun '98.

Now that I actually attend Top Gun, to cover it for the magazine, I consider myself a very lucky person. The camaraderie that you feel on that flying field has to be experienced; I can't explain it to you. The pilots are competitors, but they're also very good friends. Sometimes that's lost in a magazine's depiction of who wins and who loses, but it's probably more important than anything else in getting pilots to compete in scale. "Winning is everything" just doesn't apply at Top Gun. As those who have won will tell you, though, it is nice.

Being on that flying field—the Top Gun field—is just special, unless you're a really jaded modeler. I don't know if I should confess this in print or not, but I got downright giddy when Bubba Spivey let me fly one of his planes. It wasn't flying that plane that was so special; it was the realization that I was flying from the Top Gun field. I guess I'm just a kid at heart, but I take solace in knowing that I'm not the only one with these feelings for the place; it is the scale modeler's Mecca.

Top Gun is truly the premier scale event on the planet, and only partly because of the great airplanes that fly there. Top Gun is an event for those who watch as much as for those who do. That's what makes it special, in my view. The facilities that Frank Tiano and the Palm Beach Polo Club folks provide surpass anything I've seen at any event. There are no long bouts of standing on a flying field; there are seats for a couple of thousand folks. No Porta-Potties, either; they have the real thing. There's no worrying about getting hungry, or maybe more important, worrying about whether your wife or kids are getting hungry; they have great food and drink available on the premises. And there are certainly none of the problems people face at many meets when trying to see the action; there's not a bad seat in the place. Yes, the experience of being at Top Gun as a spectator is a pleasant one, to be sure.

And that, of course, was Frank Tiano's intent. He wanted people to enjoy seeing model aviation. Frank is a promoter of our hobby (he prefers to call it a sport), and he's one of the best we've got. Is he successful? Well, you'll have to head down to West Palm in April to find out for yourself, but when you see several thousand people—most of them not model airplane fanatics like we are—watching and cheering, you'll get an idea of what Frank's idea is doing for this hobby. When you walk into all the local grocery stores, drug stores and restaurants and see full-color posters in every one of them announcing a model airplane event, you'll get an idea of just how well Frank and Top Gun are putting model aviation in front of the non-modeling public.

We need more of this sort of promotion, and I think we all owe Frank Tiano, and the guys who help him make it happen, a big round of applause. As one of the major sponsors of the event for its entire existence, we are proud to bring you 10 full pages of coverage of the best of the best. Enjoy!

IN MEMORIAM

HARRIS LEE

Founder of the Scale Masters

1922-1998

It is with regret that we must say good-bye to one of the great leaders in the scale community: Harris Lee. He was the founder of the Scale Masters, and his will and personality have caused it to blossom into a cornerstone of our hobby. Earl Aune, current Scale Masters president, put it best when he described Harris by saying, "He knew when to coach, when to encourage, and when to leave it be." Harris will be missed, but his legacy, the Scale Masters, will live on.

AirSCOOP

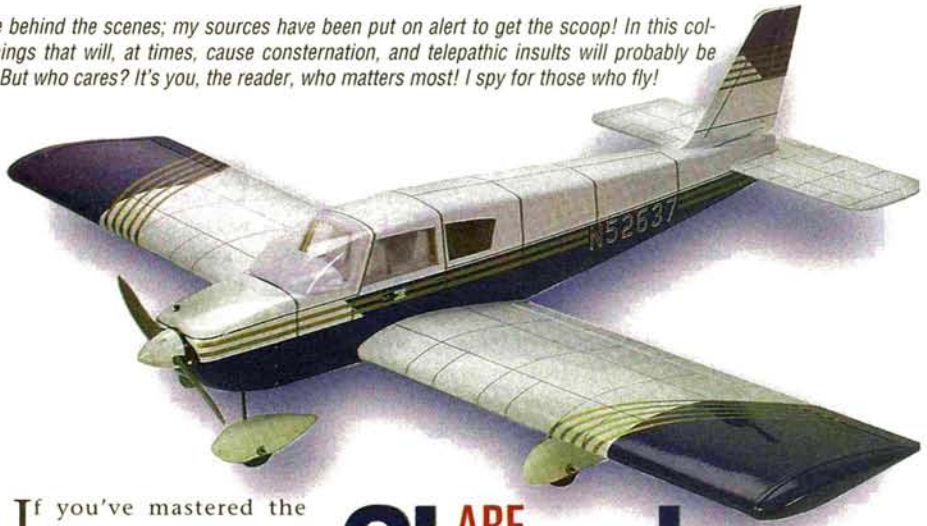
by CHRIS CHIANELLI

New products or people behind the scenes; my sources have been put on alert to get the scoop! In this column, you'll find new things that will, at times, cause consternation, and telepathic insults will probably be launched in my general direction! But who cares? It's you, the reader, who matters most! I spy for those who fly!

Little Stephens

The Stephens Akro was the father of many great things—aircraft like the Lazer, the Super Star and the Diabolo. A whole new era in full-scale aerobatics "took off" from those designs. K&A Models now offers this bit of aviation history in a clean little electric package designed around—you guessed it—the Speed 400 class of electric motors. This high-quality fiberglass kit uses 7 to 8 cells to power a standard 6V Speed 400 linked to a 2.3:1 gearbox swinging a slim 9x5 prop. According to K&A, with an average weight of 25 ounces, the full-house Akro will climb at 30 degrees and is fully aerobatic. The kit comes with a three-piece epoxy/fiberglass fuselage, cowl, center cockpit and turtle deck. The wings are foam-cores with 1/16-inch balsa sheeting, and the tail group is built up. Kit includes all necessary wood, landing-gear struts, tailwheel post, vacuum-formed wheel pants, hardware, control linkages, clear canopy full-size plans and instructions.

K&A Models Unlimited, P.O. Box 66527, Yvonne Marie Dr. NW, Albuquerque, NM 87193-6527. To order, call (505) 890-7549.



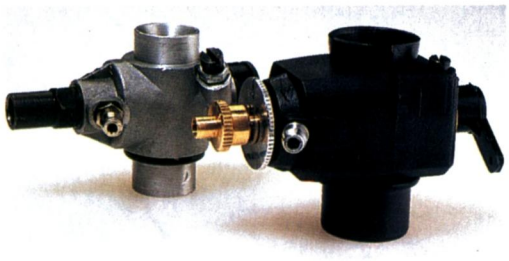
ARF Cherokee
THE NEXT STEP

If you've mastered the aileron trainer phase of R/C flying and are ready to move up to an intermediate low-wing trainer, you might want to consider Hangar 9's new Cherokee. If you want to make the move this coming weekend, you should definitely consider the Hangar 9 Cherokee because it's a nicely detailed semi-scale ARF! The Cherokee is the latest in Hangar 9's economical Value Series, and it features colorful PVC covering with simulated panel lines, scale-like trim scheme, simulated interior that can be painted, and molded ABS cowl and wheel pants to complete that sleek Cherokee profile. Experienced pilots will also like the all-wood Cherokee, as it features a semisymmetrical airfoil for good aerobatic performance but doesn't sacrifice docile low-speed characteristics. Specs: wingspan—62 inches; wing area—720 square inches; engine required—.40 to .46 2-stroke; flying weight—6 to 6.25 pounds; wing loading—19.2 to 20 ounces/square foot.

Horizon Hobby Distributors Inc., 4105 Fieldstone Rd., Champaign, IL 61821; (217) 355-9511.

New from TruTurn

I see it again and again and still don't understand: a modeler shows up at the field with his new pride and joy—scale, pattern, whatever—with an expensive engine mounted in the nose, and what do I see?—a cheap spinner on this beauty. You know the spinners I'm talking about—the kind that do that blurred-out wobbling act at idle. Guys! Finish the job off right with a good spinner like a TruTurn that won't vibrate the engine out of its mounts. Here are two new TruTurns to choose from: a 3-inch Mustang style for 2-blade props and a 2¼-inch Jet style. For a catalog of TruTurn's complete line of super-quality, machined-aluminum spinners, contact Romco Mfg., P.O. Box 836, South Houston, TX 77587; (713) 943-1867.



Mega carb

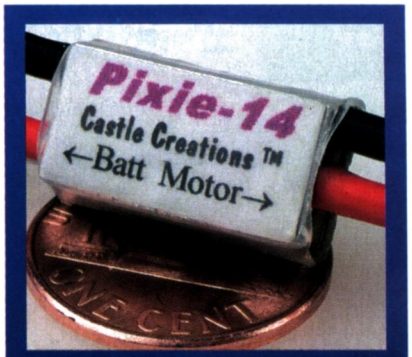
Perry-designed carburetors have been proven and improved on for over 25 years. This new, large carb—the Mega (shown here with a standard, .60-size carb in the background)—has the same, well-known design; it's just bigger. Its body is injection-molded in classic Perry style, and it has the familiar high-speed needle and low-speed-disk mixture adjustments. The bore on the Mega's throttle-barrel venturi is 0.437 inch (11.11mm) and is intended to be used on 1.08ci-size engines and up—an ideal replacement for a cranky or broken original unit. The neck's outside diameter comes sized to fit your particular engine.

Varsane Products, 546 South Pacific St., Ste. C-101, San Marcos, CA 92069; (619) 591-4228.

Tempest Mk.V

"Heritage" is a new name in the R/C marketplace, and this 1/9-scale Hawker Tempest Mk. V is the company's first offering—an interesting and different offering, I might happily add! This all-balsa-and-plywood model is fully sheeted and highlights many preformed plastic parts that modelers would find difficult to fabricate. The kit features: CAD-drawn, full-size/color, rolled plans; photo-illustrated instructions; and laser-cut parts. An optional retract installation is shown on the plans and explained in the instructions. Two decal sets are provided to replicate two popular versions of this historic British fighter. Specifications: wingspan—54.4 inches; length—45 inches; wing area—534 square inches; flying weight—5 to 6.5 pounds; recommended engine sizes—.45 to .61 2-stroke, or .60 to .90 4-stroke; number of channels required—4 to 6.

Heritage R/C, 1359 N. 18th St., Laramie, WY 82072; (307) 721-7615; or (307) 745-5076.



CASTLE CREATIONS Tiny Pixie-14

With the popularity of small, Speed 400-powered electrics, the need for tiny controllers continues to drive manufacturers to produce smaller, lighter ones. No company has beaten Castle Creations' new Pixie-14 in this regard. Surprisingly, this little dot on a wire can handle 14 amps continuous from 4 to 16 cells. It's microprocessor-controlled just like the other Castle Creations controllers, so it has safe start, soft start and auto-shutdown (if the radio signal is lost). Its BEC is useful for up to 8 cells and should be just the ticket for that little bird you're planning.

Castle Creations, 1625 E. Drury Ln., Olathe, KS 66062; (913) 397-0813; email: pdelcast@idir.net.

MaxCim goes big!

Tom Cimato of MaxCim Motors is taking us to the next level of electric powerplants with his new MaxNEO 370-5Y motor. Looking more like the front end of a Quadra 42, this large-diameter, flat-stack brushless motor will spin a 22x16 Zinger off 30 cells with a 95 percent throughput efficiency. Its 12-pole design is unique in the model motor industry and should provide an incentive to go big with your next electrics project. Keith Shaw is already setting up to fly his new 1/4-scale Fokker D-VIII with this motor.

MaxCim Motors, 57 Hawthorne Dr., Orchard Park, NY 14127-1958; (716) 662-5651; website: www.maxcim.com.

ONE JET TO GO!

With Bob Violett's new Jet Case, you *can* take it with you! BVM's popular Bandit and the new scale MiG 15 (and a few other future BVM jets) are now super easy to transport in this molded-fiberglass travel case. Take those beauties with you on a vacation because, according to BVM, the airlines will accept the Jet Case as excess baggage. Advance shipping is also possible, too, as it also complies with UPS and FedEx specifications. Made of reinforced fiberglass, weight is no more than 40 pounds, even including a model.

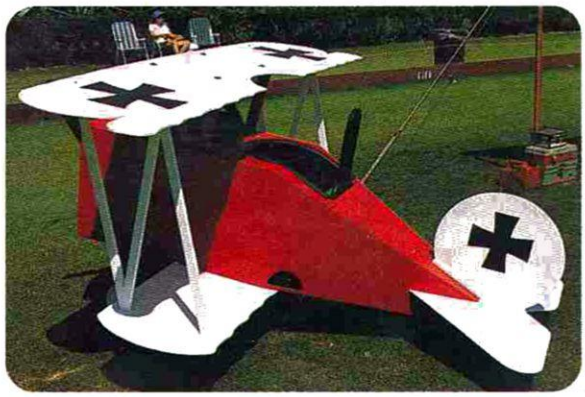
Like all other BVM products, the Jet Case has been extensively field-tested. I guess you could say the unit has been "flight-tested," having been subjected to the rigors of several international flights before being released to consumers. Well protected and securely mounted to the internal wooden structure, the models being shipped all came through without a scratch. Available in orange, white, red and yellow.

BVM, 170 State Rd. 419, Winter Springs, FL 32708; (407) 327-6333; fax (407) 327-5020.

Platt Tells All

Dave Platt has been called "Mr. Scale" for as long as I've been building airplanes. This title is richly deserved, as he has won just about every scale award imaginable, and his models often generate "How did he do that?" comments from admirers. Well, Dave has decided to take pity on us and share some of his secrets in his new video series called "Scale Modeling's Black Art." "Secrets of Weathering" is an absolute must for those who want to give their models that authentic look; Dave eloquently marches us through the varied techniques he used to weather his incredible new T-28.

Dave Platt Models, 1306 Havre St. NW, Palm Bay, FL 32907; (407) 724-2144.



Top Gun approval pending

Richard Feroldi, sixth-place winner of Top Gun's prestigious Designer Award this year with his beautiful Albatross, showed up with another head-turning aeronautical anomaly—I mean creation. I believe Richard refers to it as the "Fun Time Fokker." This Briggs & Stratton-powered ground training tool is intended to teach "preschooler pilots" precision taxiing techniques. Before being released to the public, the "Toddler Tooter," as I call it, prototype will be extensively tested by "Mr. Top Gun" himself, Frank Tiano. Mr. Feroldi was overheard saying, "If Frankie can't crash it, nobody can!"

AIRWAVES

WRITE TO US! We welcome your comments and suggestions. Letters should be addressed to "Airwaves," **Model Airplane News,** 100 East Ridge, Ridgefield, CT 06877-4606; email **man@airage.com**. Letters may be edited for clarity and brevity. We regret that, owing to the tremendous numbers of letters we receive, we can not respond to every one.

MISSING ARFs

Regarding your "Case of the Missing ARFs" editorial (March 1998), my observations are much the same as yours; I know dealers are pushing ARFs for quick sales and profits. I think kit- and scratch-builders will survive and still be the driving force in our clubs. Our local dealer has been trying to promote ARFs at our club meetings, extolling all their virtues for some time. He has had little success with club members; most of his ARF sales are to unwary first-timers.


EDITORIAL

THE CASE OF THE MISSING ARFs

My son bought an ARF four years ago. I have asked several times if he had it ready to go. The answer is always, "I just haven't had the time," but he has had time to build and fly two kits and one scratch project during this same period.

Something else is missing when people purchase an ARF. We lose the "magic of flight," which can only come from building what you fly. We lose the challenge, risk, dedication, pride of accomplishment and even the desire to fly. Every flyer that I know brings these things to the field, just as they bring a toolbox.

I know that some kit companies may not survive, but others will. MonoKote has not displaced cloth and dope or epoxy finishes, radio control has not killed U-control or free flight, and ARFs are not going to be the ultimate answer. If you take the "magic" out of our hobby, we won't have many people at our club meetings.

LA VERN PATRIE
New Hartford, IA

I've received a great deal of mail about my editorial on the discrepancy between ARF sales numbers and numbers of ARFs on flying fields. Some of you spent a lot of time trying to mathematically derive where they've gone. Some wrote humorous letters to explain the phenomenon. A couple of guys felt that the fact that I am an editor resulted in fewer ARFs being brought to the flying fields, simply because I was there (I'm not sure how that was supposed to work, as I own and fly a couple of ARFs myself). I also received some letters like La Vern's. Each of these described the pride of accomplishment and the special "magic of flight" that La Vern describes, and that only comes when something you've built actually flies. I agree with him and others that this is an important component that keeps many of us so passionate about the hobby.

But I received a lot of letters of a very different nature, and these disturbed me. These letters described the world of their authors; a world that was not very friendly toward them. I would have reprinted one of these letters, but they were all long, detailed descriptions of what had happened to these flyers, so I'll have to summarize.

The letters told stories of showing up at a club with an ARF, only to either be ignored or chastised for flying an ARF. The pictures these letters painted were not pretty, but they were consistent, even though the letters came from many places. Their authors claim that the explanation for missing ARFs at club fields is that they've been driven away; some fly alone, some don't fly at all.

If this is true—even a little bit—we need to examine the value of greeting people with open arms, whether they are flying ARFs or not flying anything at all. We need to assess how clubs function and why they exist. This hobby will not survive without an atmosphere that causes people new to the hobby to feel comfortable when they try to participate in it. Neither will it survive if we believe that "our" way is the only way. ARFs are not the enemy, but the treatment of people who fly them may be. LM

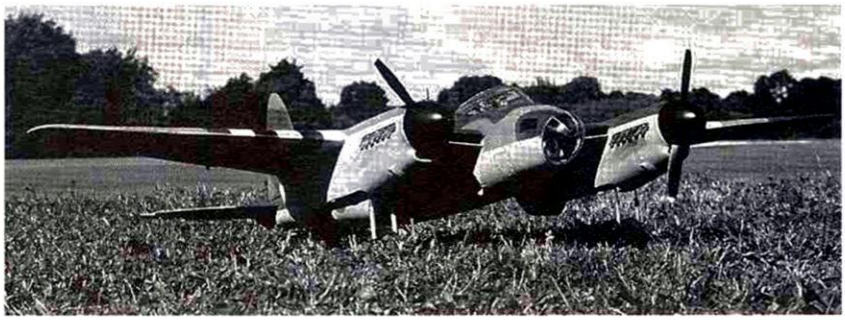
DAVE GRIFE'S MOSQUITO

I receive *Model Airplane News* every month and in the March, 1998, issue there was an article on electric planes (KRC Electric Fly). The page with Dave Grife's electric planes was great; I really like the de Havilland Mosquito. It states it was built from Brian Taylor plans. I would like to know where I can get a set of these plans, as I like British planes.

I'm working on a Royal kit of the Spitfire now, but it is powered by glow. I do build and fly electric gliders and love them. So if you could let me know where I can get the Mosquito plans, I would appreciate it.

CHUCK WILLIAMSON
Reno, NV

Dave's air force will impress all but the most jaded modeler. Indeed, Dave built his electric version of the Mosquito from Brian Taylor plans that are available from Bob Holman Plans. Understand that these plans are also designed for glow engines but Dave has installed geared AstroFlight motors instead. At 81 inches and flying 60 to 70mph, this is an impressive model in the air. LM



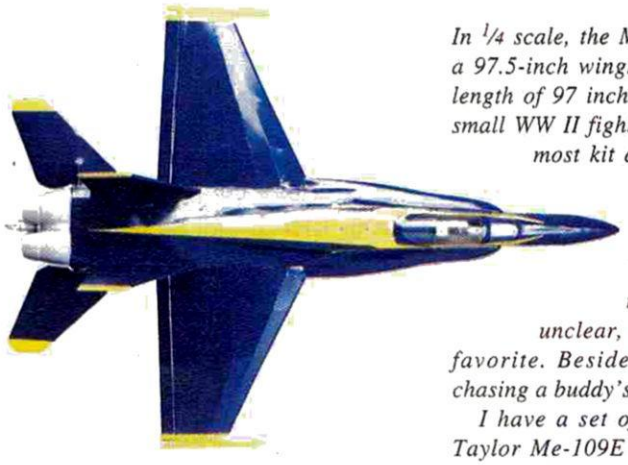
AIRWAVES

LITTLE F-18 STIRS BIG INTEREST

Larry, your contribution in the May 1998 "Final Approach" really got my interest. What a magnificent piece of work Mr. Michael Cirigliano did on his F-18.

From the photos, I was not able to tell if the model is a tractor, pusher, or ducted fan. Please tell us more! Is there a chance that Mr. Cirigliano will do a construction article on this or other small jets he may have built? I hope so.

BILL BLAYLOCK
Cameron Park, CA



Wow! The response we got to the "Final Approach" on Mike's F-18 was incredible. I guess a lot of folks have the same soft spots in their hearts as I do for small airplanes like this.

You also told me that I wasn't very clear in describing the power setup. To be honest, I thought the photos would give it away, but I guess it's to Mike's credit that the engine is not all that evident sticking out of the back of the plane.

Indeed, the F-18 is a pusher; the Norvel engine sticks out between the two exhausts. Knowing what you're looking for, you can see it (barely) in the top view of the plane. The prop has simply blended itself into the background.

As for whether Mike is going to do an article on modifying the kit for R/C, that's something for Mike to decide. How about it, Mike? LM

1/4-SCALE ME-109E

I have been searching for plans for a 1/4-scale Messerschmitt Me-109E (Emil) for quite some time. As of this writing, I have only been able to locate plans of "F" or "G" models. I asked those companies whether they were aware of anyone who made them, but they were not. I would also appreciate any leads to accessories for this plane (e.g., retracts, spinners, canopies, etc.). Can you help me? Thanks, and keep up the good work. I learn more from your column than from any of my flying buddies!

FRANK DANIELS
Madison, WI

In 1/4 scale, the Me-109E would have a 97.5-inch wingspan and a fuselage length of 97 inches, and the 109 is a small WW II fighter. For that reason, most kit and plans producers work in smaller scales for these birds. Why the "E" model isn't more popular is unclear, as it's certainly my favorite. Besides, they look better chasing a buddy's Spitfire.

I have a set of plans for a Brian Taylor Me-109E but these are much smaller than what you're looking for (68-inch wingspan). Canopy, cowl and spinner are available for this plane, and it makes for a nice model. Bob Holman Plans—(909) 885-3959—handles Taylor plans and also does enlargements of some of them; possibly, Bob could provide you with a set enlarged to 1/4 scale. I suspect that you'll have to make your own canopy and spinner in this scale, however. Because of the mounting system used by Tru-Turn, my guess is that you could easily find one of their spinners to serve as the basis, and you could cut open the cannon hole yourself, balancing it carefully when you've finished. LM

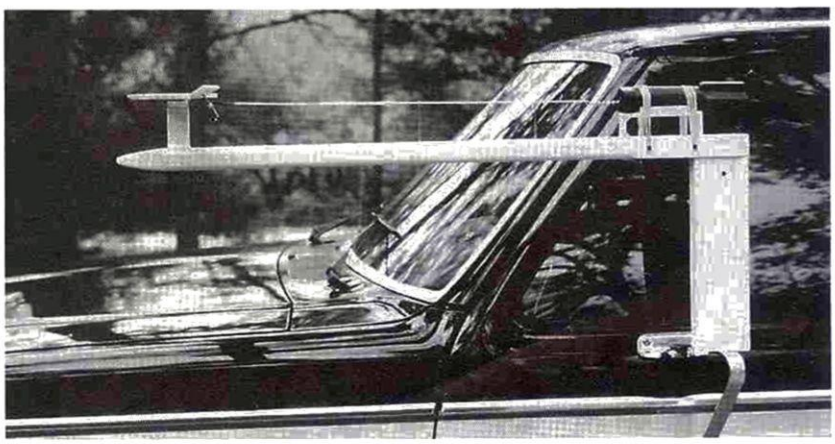
CONTROL SURFACE LOADS

Mike Leasure somehow forgot that the major weakness in his testing process is the inability of the airfoil/control surface part of the rig to deflect (pitch, yaw, bank, turn, etc.). The values he measured are valid only if he "flies" his airplanes while rigidly bolted on his truck, and the truck stays on the ground.

MARIO CANLAS
Springfield, MO

It seems to me that what Mike has measured is the upper limit of pressure on the servo during level flight. Yes; the fact that the aircraft responds to that pressure does, indeed, reduce it in much the same way as the thrust required to keep an airplane moving is less than that required to get it to move in the first place. But imagine the result of selecting an engine based on what is required to keep the plane moving.

Likewise, isn't it this upper limit that is important when selecting servos? Do you really want to use servos that couldn't produce the upper limit of their demand range? In any case, Mike's data is some of the best available, regardless of its limitations (which he readily admitted). Some will find it useful; others will not. LM



Pilot PROJECTS

A LOOK AT WHAT OUR READERS ARE DOING

SEND IN YOUR SNAPSHOTS

Model Airplane News is your magazine and, as always, we encourage reader participation. In "Pilot Projects," we feature pictures from you—our readers. Both color slides and color prints are acceptable. We receive so many photographs that we are unable to return them.

All photos used in this section will be eligible for a grand prize of $500, to be awarded at the end of 1998. The winner will be chosen from all entries published, so get a photo or two, plus a brief description, and send them in!

Send those pictures to: Pilot Projects, Model Airplane News, 100 East Ridge, Ridgefield, CT 06877-4606.

LANIER STINGER

This Lanier RC Stinger 120 was built by John Sands of Marlboro, NJ. The 88-inch-span model weighs just under 15 pounds. A Futaba Super 7 radio controls the model, and an Irvine 150 engine keeps it in the air.

TWO-PLACE TRAINER

Ron Peterka of Ramona, CA, built this Ryan STA from *Model Airplane News* plans and modeled it after a plane he photographed at the '96 Oshkosh EAA Convention. Ron's Ryan features Robart landing-gear struts and handmade flat steel flying wires, and it's powered by a K&B .61 spinning a handmade fiberglass propeller. F&M Scale Stits, handcut film graphics and full cockpit detail complete the model.

POLISH PZL-P38

This twin-engine attack fighter was designed and built by Roy Day of Rockville, MD, using information he received from Polish modeler Piotr Zawada. The model has a 66-inch wingspan, is powered by two O.S. .46 4-stroke engines and is covered in Ultracote. Roy writes that when it's airborne with its 4-strokes running, "The P-38 is quite a 'sound and sight' ... initial flights have been impressive."

SPECIAL OPERATIONS WING

This A1H Skyraider is the handiwork of Brian Arsenault of Enterprise, AL. Brian built the Ziroli design from a Madden Models kit and outfitted it with a Zenoah G62 engine, Robart retracts and Jomar battery backup. The model weighs 28 pounds. Brian notes that since he is an R/C'er and a Vietnam veteran, the model is the perfect kit for him.

PITTS S1S

Jeff Nickerson of Tucson, AZ, built this Cactus Aviation 48-percent-scale Pitts Special. The 35-pound model is powered by a 3W 120 engine and covered with F&M Scale Stits. An Airtronics radio controls the model's nine servos. Jeff writes, "The kit comes all framed up and is absolutely awesome!"

FORGOTTEN FIGHTER

This Arado 76 is the handiwork of Stan Rutz of Muskegon, MI. Stan built his first 20-inch-span Arado 76 from *Model Airplane News* U-control plans and decided to build an R/C version after he had accumulated more information. An O.S. .26FS engine powers this model.

STILL FLYING

Bob Yurkowski of Mt. Prospect, IL, sent this photo of his very first R/C model, an Air Trails Sportster. Bob writes, "Purchased in 1979 and still flying every year, just to remember my first flight, which naturally was very successful." Also in the photo is Bob's first radio, a narrow-band Kraft KPT-3C.

CULVER DART

Tom Telesca of Tarpon Springs, FL, built this 1/5-scale (72-inch-span) model from reduced 1/4-scale Jim McDonald plans. The Dart is powered by an O.S. .61FS engine and features full cockpit details and a dummy radial engine, and it's covered with World Tex and Rustoleum paint. Tom writes that it flies great.

TWIN MUSTANG

Kevin Case of Chesterton, IN, used two Midwest Products P-51 kits to build this 9-pound, 71½-inch-span P-82. The model is powered by two SuperTigre .40s and uses eight servos and two 600mAh batteries for control.

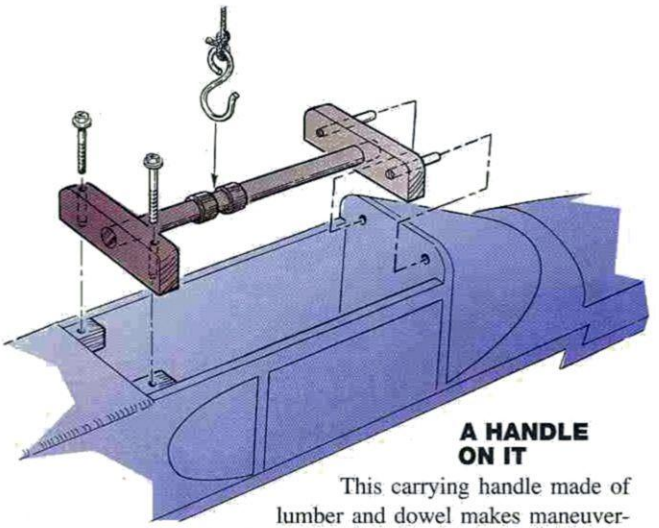
A6M3 MODEL 22

Terry Jorgensen of Highland, CA, built this 79-inch-span Zero from Dave Platt plans and equipped it with a SuperTigre 2500 with an Electro Dynamics onboard ignition system. Terry custom-made the tailwheel and main gear and finished the model with fiberglass, Nelson Aircraft paint and ProMark graphics.

Hints & KINKS

by JIM NEWMAN

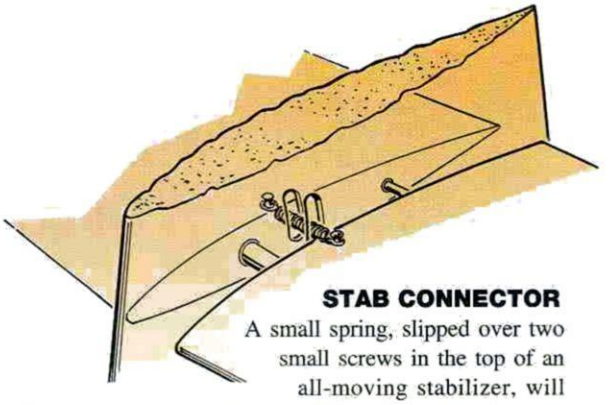
Model Airplane News will give a free one-year subscription (or one-year renewal, if you already subscribe) for each idea used in "Hints & Kinks." Send a rough sketch to Jim Newman c/o Model Airplane News, 100 East Ridge, Ridgefield, CT 06877-4606. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we can't acknowledge each one, nor can we return unused material.



A HANDLE ON IT

This carrying handle made of lumber and dowel makes maneuvering large fuselages much easier. Attach it to the model using nylon or steel wing bolts. Your columnist uses the same handle to suspend large fuselages from garage roof beams. Two bands of tape keep the hook centered at the fuselage balance point.

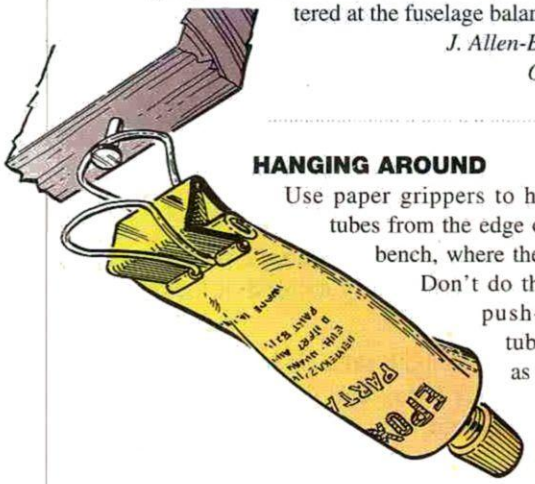
J. Allen-Bittle, Ennismore, Ontario, Canada



STAB CONNECTOR

A small spring, slipped over two small screws in the top of an all-moving stabilizer, will keep the halves from slipping off the wires while in flight. This seems to be especially important on gas- and electric-powered models where some vibration is present.

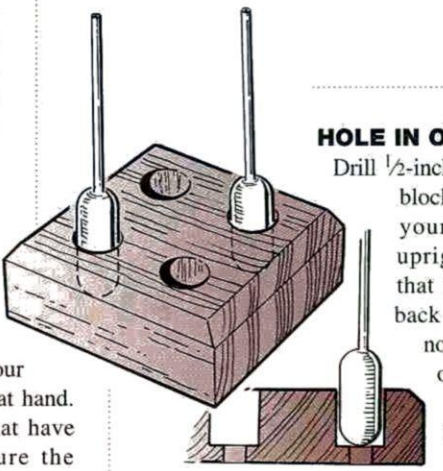
Frans Sant, S.J. Haarlem, The Netherlands



HANGING AROUND

Use paper grippers to hang your glue tubes from the edge of a shelf over your bench, where they will be ready at hand. Don't do this with tubes that have push-on caps; be sure the tubes have screw-on caps, as shown.

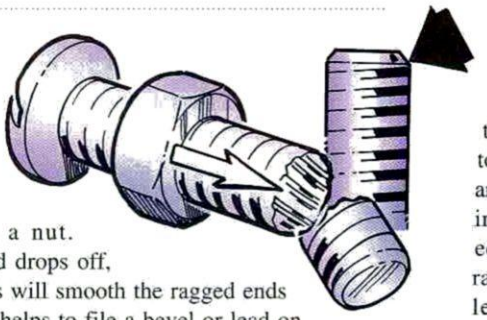
Don Giffin, Sarnia, Ontario, Canada



HOLE IN ONE

Drill 1/2-inch (3mm) holes in a block of wood to keep your CA dispensers upright. This ensures that the CA will drain back into the bulb and not harden in the tip of the tube.

Paul Neves, S. Lake Tahoe, CA



THREAD CLEANUP

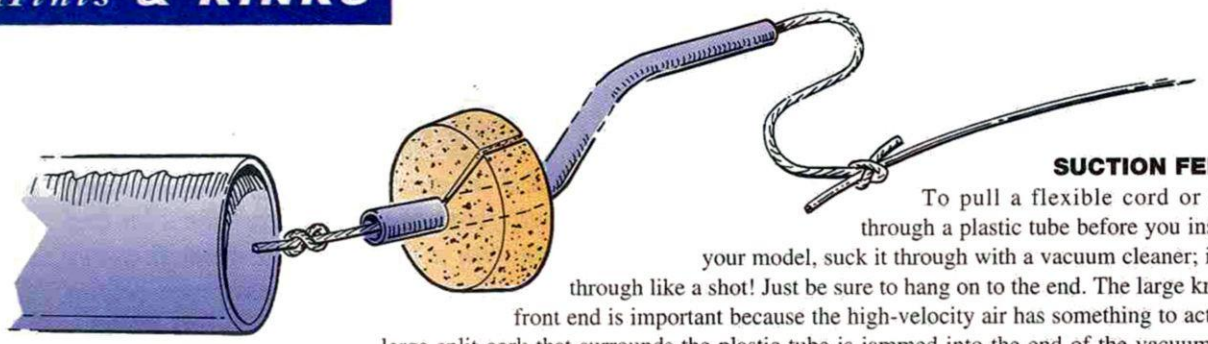
Before sawing a screw to shorten it, first screw on a nut. When the sawed end drops off, unscrew the nut; this will smooth the ragged ends of the metal. It also helps to file a bevel or lead on before you add the nut.

Tore Hansen, Drammen, Norway

SANDY MAN

Cut rigid PVC pipe of various diameters lengthwise, then glue sandpaper to the inside curve. These are wonderful tools for achieving a straight leading edge of constant radius along its length. Larry used no. 60 sprinkler pipe for his.

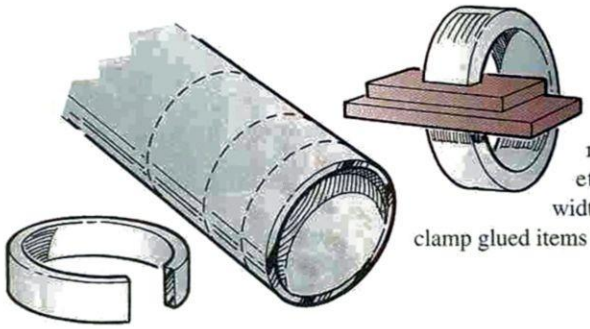
Larry Kapp, Coral Springs, FL



SUCTION FEED

To pull a flexible cord or antenna through a plastic tube before you install it in your model, suck it through with a vacuum cleaner; it will go through like a shot! Just be sure to hang on to the end. The large knot at the front end is important because the high-velocity air has something to act on. The large split cork that surrounds the plastic tube is jammed into the end of the vacuum hose so that all the air goes through the tube.

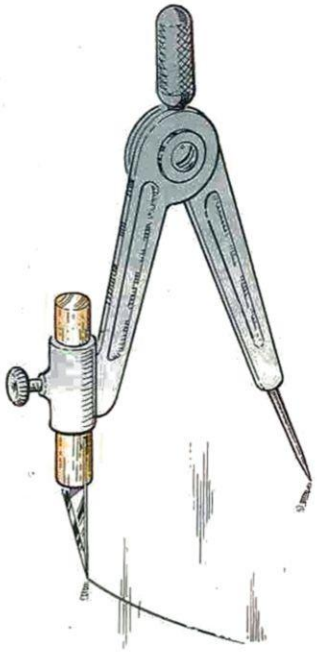
John Gustafson, Decatur, AL



GIVE US A RING

Spring clamps can be made of rigid PVC pipe of different diameters. Just cut rings of various widths off the pipe, then use them to clamp glued items together while the glue sets.

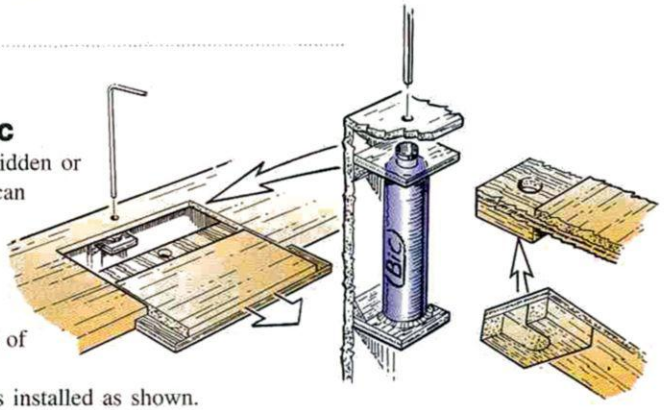
B.W. Lebien, Tualatin, OR



CIRCLE CUTTER

Glue a new no. 11 knife blade into a split dowel or short pencil, then insert it into a school compass. Provided the construction of the compass pivot is rigid, this tool will cut nice circles in covering film for markings, etc.

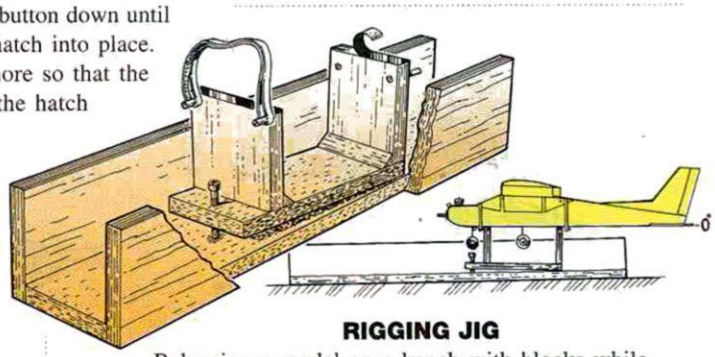
Hovik Ghassemian, Glendale, CA



CLICK YOUR BIC

This novel hatch can be hidden or the extended push-button can be scribed to resemble a screw head or Dzus fastener and mounted flush with the surface. The latch is a short section of ball-point pen with the push-button intact, and it's installed as shown. Use the wire to push the button down until it clicks, then slide the hatch into place. Click the button once more so that the button pops up to hold the hatch closed.

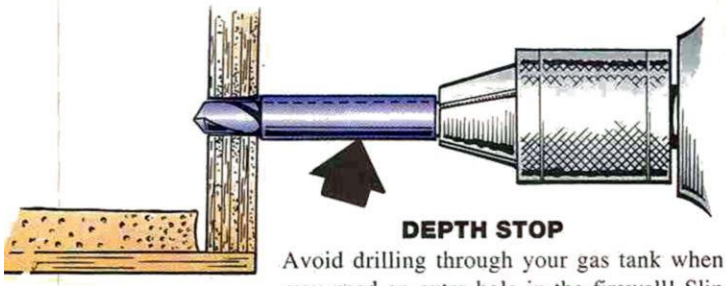
Ed Sealand, Tyler, TX



RIGGING JIG

Balancing a model on a bench with blocks while you measure angles can be hazardous to a model's health. Make this simple jig that can be clamped to the bench and to which the model can be rubber banded while you work. Note the nylon leveling screw at the end of the mounting platform. We recommend that you do not pad the top of the jig with sponge rubber; use strips of plastic electricians' tape to protect the paint. The model must be solidly mounted and must not float while you rig. It's the same for full-size aircraft, too.

Richard Greenberg, Omaha, NE



DEPTH STOP

Avoid drilling through your gas tank when you need an extra hole in the firewall! Slip an appropriate length of metal or plastic tube (arrowed) over the drill bit before drilling, so the drill will cease its progress as it emerges from the back of the plywood bulkhead.

James Moss, Oshawa, Ontario, Canada

Top Gun '98

Frank Tiano's scale invitational celebrates 10 years

by GERRY YARRISH & LARRY MARSHALL

PHOTOS BY LARRY MARSHALL, GERRY YARRISH AND WALTER SIDAS

Right: this beautiful F4U Corsair earned Corvin Miller third place in Expert. Powered by a Saito 450 R3 3-cylinder, 4-stroke engine, the Corsair received a 96.417 Static score.

Left: powered by a twin in-line cylinder Moki, this Piper Super Cub was entered in Team Scale by Greame Mears and pilot Dave Patrick. The second place Team Scale entry also won the Best 2-stroke Performance award.

Team entry of Mark Frankel and pilot Richard Fong, this Beechcraft T-34 is powered by a Moki 1.8 and has a span of 99 inches; it took 15th place in Team Scale.

Dave Platt's newest creation: a T-28 Trojan. Dave also won the Engineering Excellence award with his model; specifically, for the operational canopy mechanism he built.

Powered by a RAM 750 turbine, this DH-100 Vampire Mk 1 is the work of Kerry Sterner. Kerry placed 10th in Designer Scale.

IF IT'S THE month of April and you're in West Palm Beach, FL, and there are dozens of beautiful scale model aircraft all around, where would you be? If you answered anything other than the Top Gun scale extravaganza, I suggest you haven't been reading enough model airplane magazines. Sponsored by Pacer Technology* and *Model Airplane News,* this year's Top Gun celebrated its 10th anniversary. As you might expect from the event's organizer, Frank Tiano, this year's competition was a grand, world-class event.

Sixth place Expert: Jim Wilkinson earned a static score of 96.417 with his beautiful FW-190A8. Built from Don Smith plans, the 190 is powered by an O.S. 300 and features scratch-built retracts.

For the 1998 competition, 68 contestants accepted Frank's invitation to compete in the Florida sun. All but nine were able to attend, and this brought the number of entries to 59. Even the weather cooperated this year, and the notorious Top Gun crosswinds seemed to abate for most of the 10th birthday bash. Top Gun includes three scale competition classes: Expert, Team and Designer. Static judging takes into account accuracy of color and markings, outline and the overall quality of craftsmanship. The four flight rounds that follow Static judging are judged for flight realism, placement and execution of the various mandatory and optional maneuvers.

Beginning a day earlier than usual, static competition and test flights commenced on Wednesday. From the start, it seemed that things would be a little bit different this year, and there were no clear indications of who might have an edge until very late in the competition.

On the wing, Dave Platt's T-28 makes a high-speed flyby. Dave's 1/6-scale model has a wingspan of 82 inches, weighs 22 pounds and is powered by a Moki 1.8.

Left: caught at the moment of turbine ignition, the Lim-6bis delivers an impressive fire plume as the Golden West turbine comes to life. Below: one of the more unique Team Scale entries was this Lim-6bis. Entered by Tad Krzanowski and Jim Hiller, the Golden West-powered model is the Polish version of the Soviet MiG-17F. It finished in fifth place.

Axis powers prevail in designer scale

Displaying his new Me-109E for static competition, Jeff Foley gives us a sense of scale for his new Top Gun entry.

Designer scale is a class in which the participant must design, build and fly the aircraft entered. This year, two great guys, flying two great German fighter plane models, took first and second in this prestigious scale-modeling class.

The paint was barely dry on Jeff Foley's Me-109E when he rolled it out of his trailer this year. Gerry and I were in love with the model, though, as both of us like the E model of this classic fighter, and Jeff has done it in just the right size for our transportation limitations. In 1:4.5 scale, the wingspan on this 22-pound craft is 86.6 inches. It flies like a dream—at least, when Jeff is on the sticks—and, with the exception of one crosswind landing that gave Jeff a bit of trouble, the narrow landing gear just wasn't a problem during takeoffs and landings. Jeff powers the model with a Moki 1.8, and it doesn't lack for power. Rumor has it that Jeff is going to offer this plane as a kit.

Roy Vaillancourt and his FW 190A8. Roy uses household latex paint to finish his models.

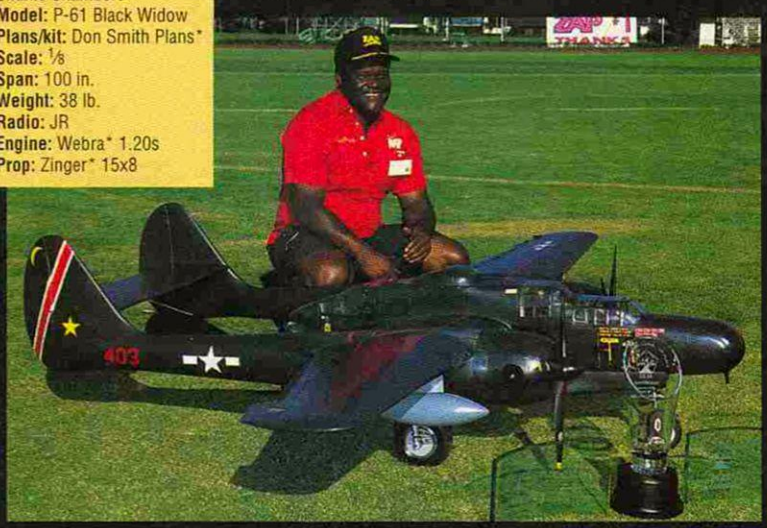
Roy Vaillancourt beat back the Allies to take second place. Less than 2 points behind Jeff, Roy put in a solid performance with his FW-190A8. He told us that the functional and scale air-cooling fan on the front of the 190 really solved some overheating problems he'd had in the past with the fully cowled Quadra 65. After having the color chips matched, Roy painted the model with household latex, and his 190 is magnificent. Roy sells everything necessary (except for his modeling talent) to create your own FW-190.

So if you're up flying your Spitfire or Mustang, watch your six, as you might just find Foley or Vaillancourt trying to increase their kill total. Congrats to both of these fine gentlemen.

Top Gun's Number Ones!

There are three categories of competition at Top Gun: Expert class is where most of the solo participants compete; Designer class is for people who have designed the airplanes they fly; and Team Scale is an opportunity for a builder to find a pilot and compete as a team. "Mr. Top Gun" is awarded to the person who has the highest total score, regardless of the category in which he competed.

First place Expert and Mr. Top Gun:
Charlie Chambers
Model: P-61 Black Widow
Plans/kit: Don Smith Plans*
Scale: 1/8
Span: 100 in.
Weight: 38 lb.
Radio: JR
Engine: Webra* 1.20s
Prop: Zinger* 15x8



First place Team Scale:
Mariano Alfafara (right)/Dave Pinegar
Model: J-3 Clipped-wing Cub
Plans/kit: Mike Gretz plan
Scale: 1/4
Span: 86 in.
Weight: 12 lb.
Radio: Futaba*
Engine: O.S. 1.60
Prop: Master Airscrew* 15x8

Brian O'Meara competed with his beautiful O.S. 300-powered Hawker Sea Fury. Built from Jerry Bates plans, the model has an 82-inch span and Gene Barton retracts.

ALWAYS SOMETHING NEW

There was a flock of new, never-before-seen models in the running. A big change of pace came from Garland Hamilton, who traded in his turbine-powered Lockheed DT-33B drone director for a Grumman F8F Bearcat built from Jerry Bates plans. Spanning 78 inches and powered by an O.S.* 300 4-stroke engine, Garland's model included a beautifully engineered, scale set of articulating landing gear. Corvin Miller, whom everybody knows flies nothing but civilian Globe Swifts, showed up this year with a modified Ziroli* F4U Corsair. Powered by a Saito* 450 R3 3-cylinder radial 4-stroke engine, Corvin's new Navy fighter sported a flawless, high-gloss finish duplicating the paint job of the full-size restoration he copied.

The Team Scale entry of Glenn Torrance and Tom Kosewski, this Fokker E.V flew very well. With a wingspan of 82 inches and weighing 14 pounds, the 1/4-scale model was powered by an O.S. 1.60 and took 12th place.

First place Designer Scale:
Jeff Foley
Model: Me-109E
Scale: 1/4.5
Span: 86.6 in.
Weight: 22 lb.
Radio: JR*
Engine: Moki 1.8
Prop: Menz* 18x8

Another jet jock who traded in his jet for a piston-powered fighter was Jeff Foley. Jeff has flown a Jet Model Products* T-33A for several years and placed third last year in Expert. Jeff's weapon of choice this year was his own-design Me-109E-7. With a wingspan of 86.6 inches and powered by a Moki* 1.8 glow engine, Jeff's composite-and-wood Messerschmitt is simply gorgeous. Kerry Sterner can always be counted on to have something different, and this year, he entered a turbine-powered DH-100 Vampire. Entered in the Designer class, Kerry's twin-tail jet has a 96-inch span and is powered by a RAM* 750 kerosene burner.

Two other never-seen-before models (each turbine powered) were entered in Team Scale. Albert Adaujo and Rei Gonzalez teamed up with a beautiful 1/8-scale Dassault Mirage 2000. Their delta-wing jet has a wingspan of 65 inches and is powered by the RAM 750 turbine. The other team entry was a Lim-6bis (Polish designation for the MiG-17F Fresco C.) by Tad Krzanowski and Jim Hiller. This unusual Soviet-bloc fighter had the most unique harmonics signature at the meet. Whenever it flew, the Lim-6bis sounded like it was growling! Power comes from the Golden West* turbine for this 56-inch-span, 1/7-scale model.

Toned down a few notches from the

Top Gun

Top Gun

Nick Ziroli Jr. prepares to deliver a scale torpedo with his 1/6-scale Grumman Avenger. Power comes from an Eagle 4.2 gas engine for this 108-inch span, 49-pound Navy torpedo/bomber.

fire-breathing turbines was Canadian Jean Chevalier's 1/3-scale Ryan STM primary trainer. Jean has been flying a 1/4-scale Ryan ST for several years and wanted something new for the 10th anniversary. He enlarged the plans for the old kit and scratch-built his larger version. Powered by a Quadra* 52 and spanning 120 inches, the STM was very realistic and stable. With the model weighing 36 pounds, however, Jean said he wanted to fit his Ryan with a larger, more powerful engine.

GROUND SUPPORT

One thing is for sure if you compete on that field of green in West Palm Beach: you will meet some of the big-name manufacturers. Bob Violett is always on the flightline, and he gives his support to all BVM* jet pilots. Bob and Silvia Walker of Robart Mfg.* are also usually on hand. Bob has, on several occasions, helped troubleshoot retract problems and has even replaced damaged retract parts so a pilot could finish the event.

When it comes to Moki engines, Jim Gerard of Gerard Enterprises* often lends a hand in the pits to get those powerful 2-stroke glow engines running properly.

As in all competitions, models do get damaged at Top Gun, and Pacer Technology is always available with various Zap* products to do field repairs. It is truly amazing to see a badly damaged model resurrected at Top Gun to fly again.

A relatively new sponsor at Top Gun is Jerry Connelly of Wildcat Fuels*. This year, Jerry donated all the glow fuel for the event. One contestant who was very pleased about this was Robert Benson, who teamed up with Geoff Combs to fly his T-34C. Robert had been having a lot of difficulty with his engine overheating and had tried everything short of rebuilding it to get it to run. Jerry suggested Robert try some Wildcat fuel, and that did

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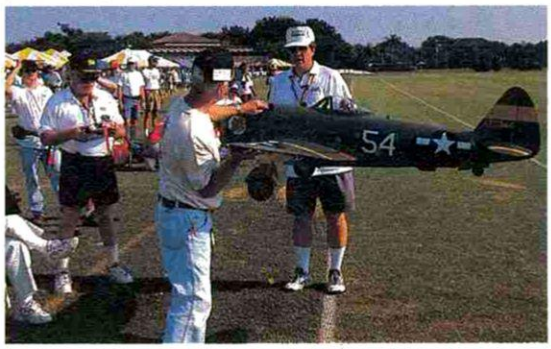
Tom Polapink placed third in Designer Scale with his Pfalz D-IIIa. Tom's WW I fighter has a span of 74 inches and is powered by an O.S. 1.20.

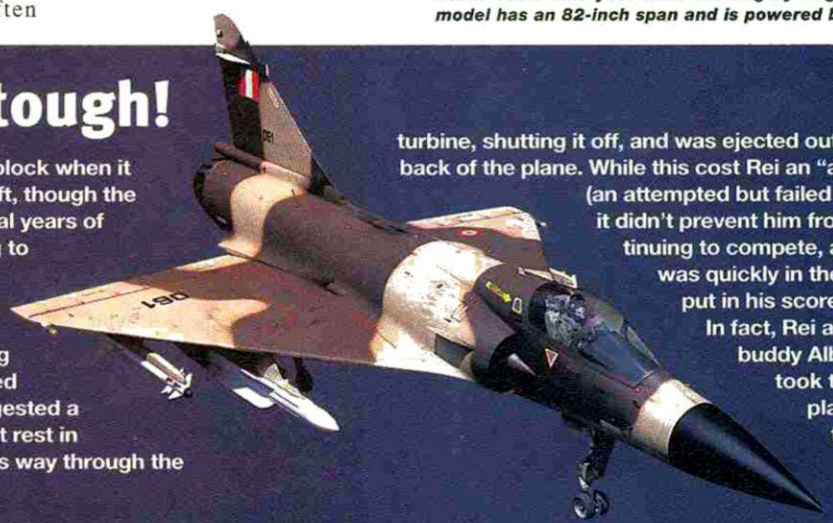


Jim Sandquist (right) and Wayne Siewart hold Wayne's P-47 Thunderbolt while pilot Frank Tiano demonstrates the retracts for the flight judges. Wayne and Frank entered Team Scale this year with the mighty Jug. The 1/6-scale model has an 82-inch span and is powered by a Brison 4.2.

Turbines are tough!

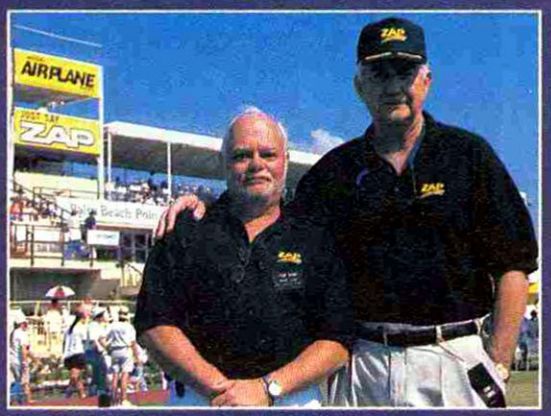
Turbines are the new kids on the block when it comes to powering model aircraft, though the modeling community now has several years of safely using them, and we're coming to expect great reliability from these power systems.

Rei Gonzalez of R.A. Microjets did a little experiment at Top Gun. During takeoff with his Mirage 2000, powered by a RAM 750 turbine, his turbine ingested a hunk of Wayne Siewart's P-47 (may it rest in "piece"). The chunk of balsa made its way through the turbine, shutting it off, and was ejected out the back of the plane. While this cost Rei an "attempt" (an attempted but failed flight), it didn't prevent him from continuing to compete, as he was quickly in the air to put in his scored flight. In fact, Rei and his buddy Albert took third place in team scale.



The people who make it happen

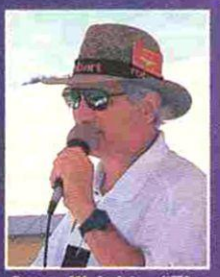
A decade ago, Frank Tiano had a dream. He wanted to show off scale modeling to the non-modeling community. He dreamed of bleachers full of parents, with their kids, watching some of the best modelers in the world fly museum-quality scale models. Because of who he is, Frank has made his dream come true and because of it, he's caused many of us who are scale modelers to create dreams of our own. Often these dreams involve the atmosphere and prestige that is Top Gun, but always they are centered on our next scale project. To say that the modeling community has benefited from Frank's efforts is far too much of an understatement, as Top Gun has done more to improve the public's view of model aviation than anything else. Even within our own ranks, it has become a rallying cry; a point of reference for the upper crust of scale modeling.



Frankie T. (left) and Herschel Worthy are very proud of Top Gun's 10-year run.

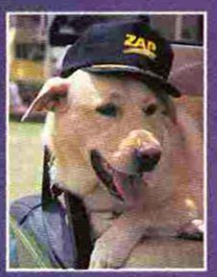
Frank would be the first to acknowledge that he hasn't done it all on his own. Herschel Worthy of Pacer Technology, one of the principal sponsors, helps Frank in some of the organizational affairs that are required to put together Top Gun. We at *Model Airplane News* try to help in our way, and we're really proud to have been a major sponsor of the event for its entire 10-year existence. The many other sponsors who help out by defraying costs and providing prizes are very much a part of what makes Top Gun as good as it is. The folks at the West Palm Beach Polo Grounds are also to be applauded for providing an unbelievable facility for Top Gun's participants as well as for its spectators.

One of the icons of Top Gun is Sam Wright. Sam has been the announcer for Top Gun since its inception, and he does a remarkable job of bringing the flying to life, explaining the maneuvers being flown and talking about the details of the aircraft themselves; he is the connection between the pilots and the spectators. He'll tell you that he has the best view in the place, but he also works harder than anyone else to maintain a level of interest and excitement throughout the event, and Top Gun wouldn't be Top Gun without him.


Sam Wright, "The Golden Voice of Top Gun," is always heard but seldom seen. Sam has announced every Top Gun but one.

It takes a lot of judges to properly deal with all the static and flight judging, and Frank has always been fortunate to get good people who are willing to give of themselves to make it a fair contest. While some of their expenses are paid, these guys don't do what they do for the money; they just love model airplanes and scale contests.


The hard-working Top Gun judges and crew (back row, standing, left to right): (Chief Judge) Bill Holland, (FJ) Mike Marecki, (FJ) Charlie Beer, (FJ) Tom Kozel, (FJ) Mike Bacon, (SJ) Jim Parker, (FJ) Harry Andren, (scribe) Dick Voight, (FJ) John Smith. Front row, kneeling, left to right: (SJ) Lee Henderson, (Captain Static Judge) Bob Curry, (Head Score Keeper) Rosella Curry, (FJ) Cliff Tacie, (FJ) Jim Semonian. Not shown: (Asst. Chief Judge) Bill Deverna, (FJ) George Jenkins.


Top Gun's top dog, Jake.

And then there's Jake; Jake is the cornerstone of Top Gun. Without him, I'm sure Top Gun would be less than it is. Jake is Frank's dog, and when Frank starts feeling frazzled because five people need him to be in five different places, Frank can turn to him for support. Jake, keep up the good work so that we can have another 10 years of Top Gun.

Sepp Uiberlacher flew this beautiful Hawker Tempest to fourth place in Designer Scale. The 83-inch fighter is powered by a Moki 1.8.

Top Gun

(continued from page 32)

the trick. Robert went on to finish in seventh place in Team Scale. Of course, the event itself could not be what it is today were it not for the generous contributions of all the sponsors, big and small, who support Top Gun. All are to be thanked for their help.

This Ziroli P-38 Lightning was flown by Greg Hahn. Powered by twin Zenoah G-38s, the Lightning flew very well until an electronic glitch put it into a nearby pond. Greg's comment: "It happens!"

HOT ENGINES

One of the major challenges in any competition is maintaining a reliable engine to get you through the event. If you are to finish first, first, you have to finish. Engine problems cause the majority of incomplete flights, and the stakes are very high when it comes to making thrust.

Flying his beautiful, all-silver B-29 flying R/C combat. Bubba and his buddy Wayne put on a team aerobatic show that always excites the crowd, and Jason Shulman puts his Extra through its paces. Geoff Combs also wows the crowd with his very large Extra.

For the last couple of years, Chip Hyde has put in some show-stopping performances. His superb power management abilities allow him to fly very low and very slow, and it's a real treat to watch him fly. This year, Chip was doing low-level 4-point rolls with his 42-percent Ultimate. The neat thing was that he did them less than half a wing length above the ground. That's right; no typo here. He would enter the maneuver in level flight and when he rolled to the first point, he would increase altitude just enough to clear the wing and then drop back down once he rolled inverted. The procedure was repeated to negotiate the third point of the roll. Note also that he was flying so slowly that this entire sequence was done in less than the length of the runway. Magnificent!

A crowd-pleaser has always been Mack Hodge's large B-29 that he flies like an aerobatic plane, doing point rolls and low inverted passes. This year he and his buddies added a new twist: they dropped an X-1 from the wing and glided it down to a landing. Just before touchdown, they fired a solid propellant rocket and powered it up in a spectacular fashion, doing a few victory rolls on the way down the second time.

The spectators really enjoy the halftime show, and it's a good time for the competitors to relax and enjoy the show themselves. As Greg Hahn said, "Top Gun is a five-day fun fly with a few competition flights thrown in." Hope you can make it next year.

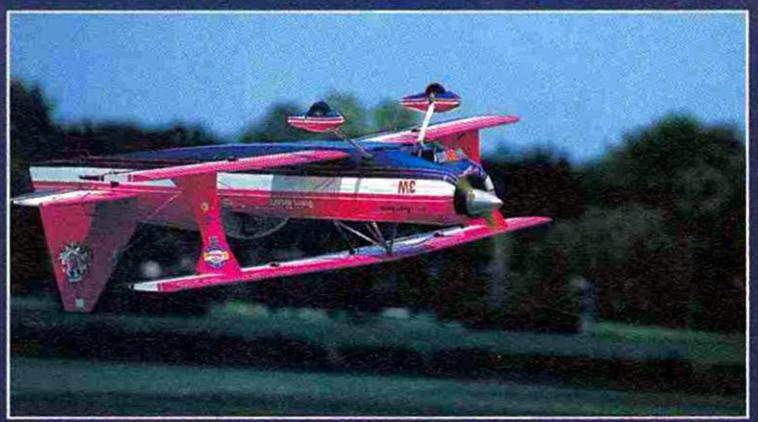
Top Gun halftime show is super

This year, Mac Hodges' B-29 was outfitted with a scale Bell X-1.

Each day at Top Gun, there is a halftime show. Orchestrated by Bubba Spivey of Lanier RC*, the show is a super production, with almost no down time and yet a large variety of model aircraft were exhibited; everything from turbines breaking the scale sound barrier to guys

Bubba Spivey, the ring master of the Top Gun halftime show, works very hard to make it all happen.

Left: Chip Hyde's 42-percent-scale Ultimate bipe halfway through a 4-point roll; verrry low!



Top Gun

Eighth place in Designer Scale went to Phil Sibille with his Piper Super Cub.

Jean Chevalier flew this scratch-built, 1/3-scale Ryan STM primary trainer. Jean placed 12th in Expert.

all that can be achieved in the world of scale modeling. For some, Top Gun means victory, while for others, it means more hours spent at the building board. But for all who attend, it is a time for fun and recognition. For even to be *invited* to West Palm Beach means you are the best.

The only really good way to understand all the elements and personalities that go into this thing called "Top Gun" is to experience it yourself. We can only hope to scratch the surface and show the very obvious points here. Summed up, Top Gun is *the* event in which the very best of the best in scale aircraft modeling compete, adapt, endure and prevail.

**Addresses are listed alphabetically in the Index of Manufacturers on page 142.*

Free flight at Top Gun

Top Gun is not just an R/C event; it's a scale event, and diehard scale modelers do it all. This year there were two free-flight events. The first, sponsored by Herr Engineering, was a traditional, rubber-powered scale event. As the likes of Barbee, Siewert, Parenti, Platt and others took the field, there was a lot of laughing, joking, and having fun. But when the winding started, pilots became serious, as the competition had begun. In the end, Wayne Siewert showed all that he was king of the hill with his Found.

But the revelry didn't stop there. Rich Uravitch is now sponsoring a Jetex scale event, so rather than winding rubber, these guys were lighting fuses. It was clear from the results that it has been a while since these guys have flown Jetex, as the results were less than stellar. But there was that addictive smell of propellant burning, the *Psssst* ... sound that many of us used to love to hear, and even cries of "Don't touch the motor!" that we used to shout, mid-giggle, at the end of a flight. Rich, you've got me hooked ... gotta get myself a Jetex plane and start building.

MODEL AIRPLANE NEWS

FIELD & BENCH REVIEW

by GERRY YARRISH

BEING A MODELER means different things to different people. To some, it means being a pilot; to others, it means being a sawdust-covered basement dweller who creates wondrous things simply by rubbing two balsa sticks together. I fall into the balsa-cutting, glue-and-paint-on-the-shirt builder category, and my flying skills are average. While at the flying field, I work on improving my skills and try to have fun.

Improving your skills requires a good airplane designed for the type of flying you want to learn. For my needs, a fast-building pattern ship (without retracts) was the answer. Enter the Aurum Sports 30 from Kyosho*.

Kyosho

AURUM SPORTS 30 ARF

Glow or electric power; you can have it either way. Here, our Aurums sport both power systems.

PHOTOS BY GERRY YARRISH & LARRY MARSHALL

WHAT'S IN THE BOX?

I've reviewed several ARF models, but I was particularly impressed with the Aurum Sports 30. From the start, it was obvious that the Aurum is not your run-of-the-mill ARF. It is a well-built, beautifully covered .30-size version of the 1.20-size FAI pattern ship, the Aurum Z, designed by FAI champion Giichi Naruke of Japan. With its long, slender fuselage and fully sheeted, double-tapered, built-up wing, there's no question that the Aurum is a miniature pattern ship. The Aurum is a tail-dragger, but it has fixed aluminum main gear in place of the wing-mounted retracts of its big brother.

The kit is very complete and

A mini pattern ship with big performance

includes well-illustrated instructions, a painted fiberglass engine cowl, clear plastic canopy, decals, wheel pants and wheels, hardware, aluminum main landing gear and steerable tailwheel. I added a Sullivan* 8-ounce fuel tank, Du-Bro* vibration-reducing engine mounts and fueling valve.

Construction (or should I say assembly?) is very straightforward and takes only a few hours. The model comes with all control surfaces hinged, but you do have to glue the hinges into place. I started the project by joining the two wing panels with 30-minute epoxy. While the epoxy sets, it is a simple matter to install the

SPECIFICATIONS

Model: Aurum Sports 30

Manufacturer: Kyosho

Type: low-wing, sport-pattern ARF

Wingspan: 52 in.

Length: 51¼ in.

Weight: 4.5 lb.

Wing area: 515 sq. in.

Wing loading: 20.16 oz./sq. ft.

Airfoil: symmetrical

Radio req'd: 4-channel (throttle, rudder, ailerons, elevator)

Radio used: JR 8103

Engine req'd: .32 to .40 2-stroke or .48 to .54 4-stroke

Engine used: Webra .32

Street price: $339.99

Comments: the Aurum Sports 30 ARF is a smaller version of the 1.20-size Aurum Z FAI pattern ship designed by Giichi Naruke of Japan. It is a built-up, all-wood tail-dragger and comes covered in a five-color MonoKote finish. The fiberglass engine cowl and wheel pants come painted.

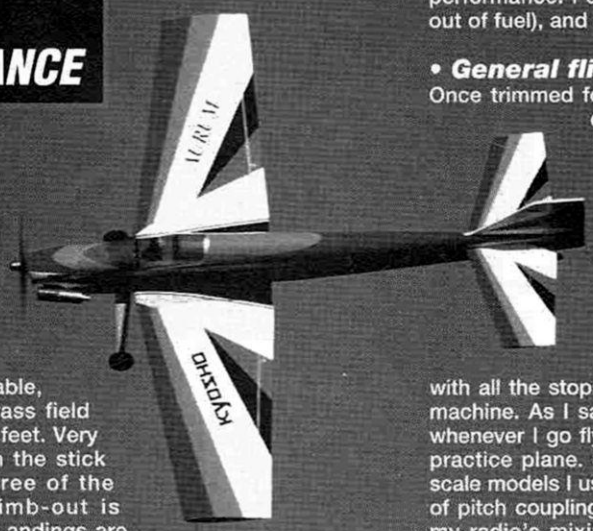
Hits

- Excellent workmanship.
- Good flight characteristics.
- Easy assembly.

Misses

- I replaced the small, metric wing hold-down bolts with 10-32 nylon bolts and blind nuts.

FLIGHT PERFORMANCE



• Takeoff and landing

As would be expected of a sport pattern model, the Aurum's long tail moment makes for very easy, arrow-straight takeoffs. With a Webra .32 engine, there's plenty of power available, and takeoff from a grass field takes about 80 to 100 feet. Very little backpressure on the stick breaks the wheels free of the ground, and the climb-out is totally undemanding. Landings are almost automatic, as the Aurum holds its energy very well. Once in the landing pattern, I pulled back to ½ throttle and then to ¼ on final. A slight backpressure held on the stick brings the model in nicely, as the descent rate is very shallow but not overly fast. The model handles very well at slow speeds, and you can do 3-point after 3-point landing and never get tired of its performance. I did have a couple of dead-stick landings (ran out of fuel), and these were also very easy on the nerves.

• General flight performance

Once trimmed for straight and level flight, the Aurum is very comfortable to fly at any speed you like. For most of the time, I flew around at about ¾ throttle and saved full out for vertical maneuvers. At slower speeds approaching stall, there are no surprises; control is good all the way to the break. When the model does stall, the nose simply drops, and the wing starts flying again.

• Aerobatic flight performance

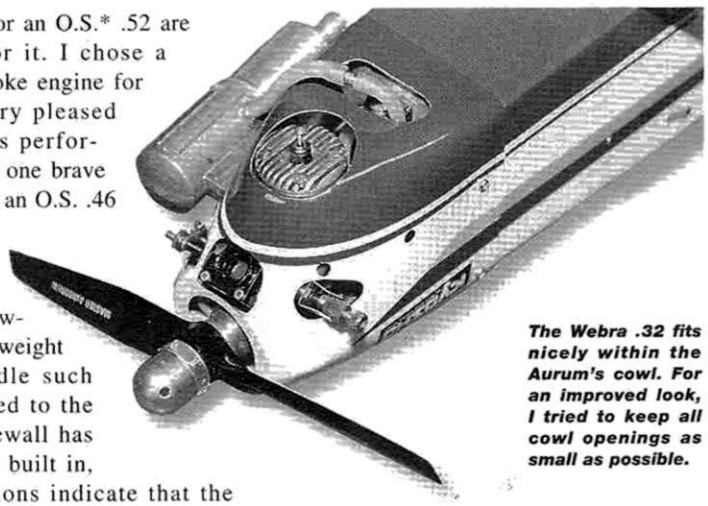
"Responsive" is the word that comes to mind; with all the stops pulled out, the Aurum is a solid, predictable machine. As I said before, I like to improve my piloting skills whenever I go flying, and the Aurum is an excellent all-around practice plane. Stability is neutral, at least compared to the scale models I usually fly. In knife-edge flight, there's just a hint of pitch coupling, but not enough for me to want to play with my radio's mixing functions. Four-point rolls are done with almost no effort at all, as the model holds its attitude and heading nicely. When it comes to vertical and climbing performance, my Webra .32 proved to be powerful enough for my style of flying. Verticals are not unlimited, but there's plenty of pull from the 10x7 prop. The only limitation that I could find with the Aurum is my own flying skills, and these are improving nicely as my stick time with this little pattern ship increases.

tail feathers in their slots in the fuselage. Parts fit is very good, and I used thin CA to attach the parts.

When the wing panels had been assembled, I placed the wing in the wing saddle (a very precise fit) and glued the wood belly fairing onto the underside of the wing. I had to sand only a small amount of the fairing's aft edge for a perfect fit with the fuselage. I replaced the smallish, metric wing hold-down bolts with 10-32 nylon bolts and blind nuts. The main landing gear is simply held in place with wood screws, and at first I was a bit concerned. But now, after several flights, I have had no problems with the gear becoming loose or being knocked off on hard landings.

ENGINE AND RADIO INSTALLATION

The box art shows the Aurum powered with a 4-stroke engine, and I have heard that a Saito* .56 or an O.S.* .52 are ideal choices for it. I chose a Webra* .32 2-stroke engine for mine and am very pleased with the model's performance. I know of one brave soul who installed an O.S. .46 in the nose, but this is just overkill. It is good to know, however, that the lightweight Aurum can handle such horsepower bolted to the firewall. The firewall has some right thrust built in, and the instructions indicate that the engine should be offset slightly to the left to bring the prop shaft closer to the centerline. Properly set up with 3 degrees of right thrust, the Aurum tracks beautifully.

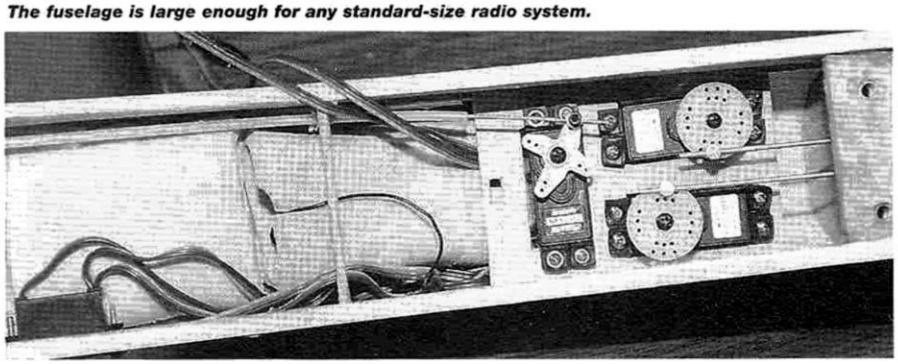


The Webra .32 fits nicely within the Aurum's cowl. For an improved look, I tried to keep all cowl openings as small as possible.

The most time-consuming task during construction was fitting the engine cowl into place over the engine. I took my time and made all the openings as small as possible. I drilled a couple of holes in the side of the cowl so that I would be able to get to the muffler-mounting screws with an Allen wrench. The cowl has to be installed before the muffler can be attached to the engine, but the clean look of the finished model is well worth the extra effort. I also left the spinner off for easier field maintenance and increased engine cooling.

I installed a JR* 8103 radio and standard-size servos for control. The elevator pushrod is a "Y" configuration with separate pushrod wires going to each elevator half. The ailerons are controlled with

The fuselage is large enough for any standard-size radio system.

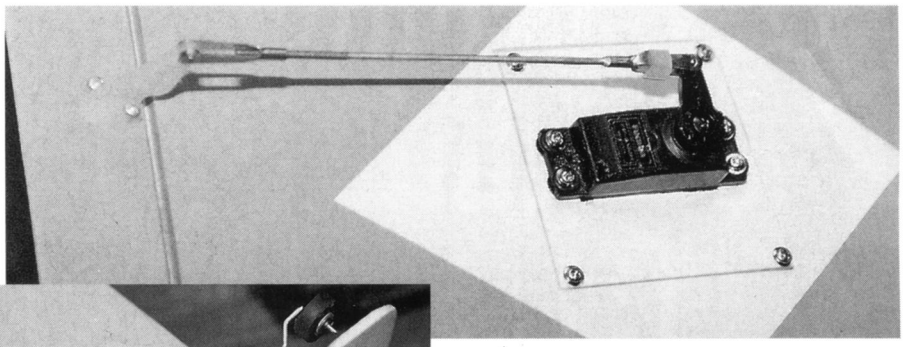


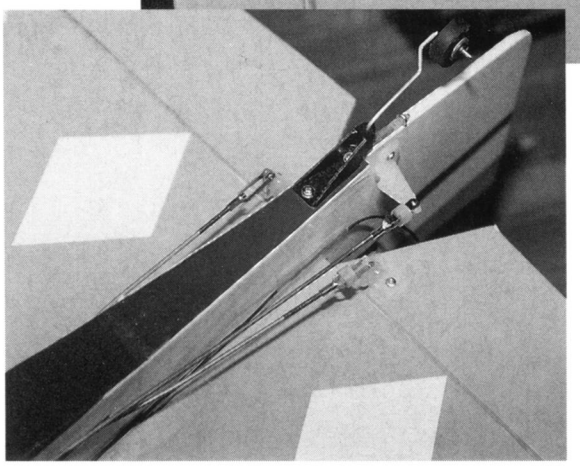
direct-control servos in each wing panel just in front of the ailerons. The model comes with fishing string already strung from the aileron-servo openings to the wing center section, so it is really easy to feed the servo leads into place.

FINAL ASSEMBLY

To install the fuel tank, I enlarged the opening in the former just in front of the wing with a motor tool. I then held the tank in place with a smear of PFM* adhesive. The canopy is a perfect fit and requires no trimming. I stuck it into place with more PFM, and then I applied the canopy framing decals.

The servos fit nicely in the plywood tray, and I wrapped the RX and battery pack with foam and stuffed them into place just behind the fuel tank. I was very pleased that my model balanced properly on the CG with only the addition of a large safety prop nut. With just a final application of heat to re-shrink the film covering, the Aurum was ready for the flying field. Total building time was about five to six hours.





Above: the aileron servos are in the wing panels just in front of the ailerons. The wing panels come with fishing line already in place to help guide the servo leads to the center openings. Left: tail control linkages are typical with a "Y" pushrod going to the elevator halves.

AT THE FIELD

It was late November when I made my first attempt at flying the Aurum Sports 30. A clogged needle valve, not to mention the frigid temperatures, however, prevented me from committing aviation the first time out. After cleaning the engine and waiting for a warmer day, the Aurum showed itself to be a very friendly flyer. With its five-color paint scheme and smooth flight characteristics, the model was quickly noticed by fellow club members, and now three versions share pit space at the flying field. If you're an "addict" of smaller performance airplanes, then I think the Aurum Sports 30 could be your next "fix."

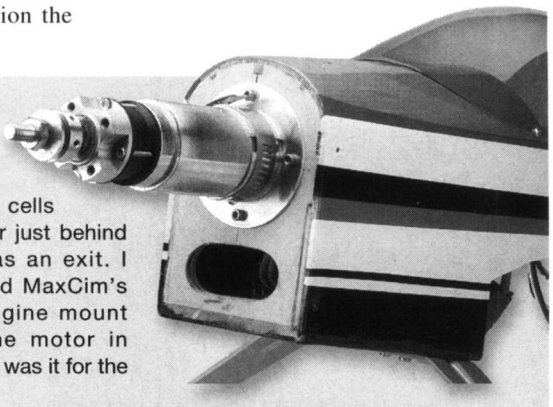
**Addresses are listed alphabetically in the Index of Manufacturers on page 142.*

THE AURUM GOES ELECTRIC

The Aurum looked to me like a great candidate for conversion to electric power. It is relatively light, and the interior organization would allow me to easily stuff 14 to 16 cells into it. By weighing all the parts, I determined that the airframe would weigh 46 ounces. Four servos, a receiver and a receiver pack add another 10 ounces, for a total of 56 ounces. To keep the wing loading on the 515-square-inch wing around 25 oz.-lb., I needed a power system that weighed 45 ounces or less. For that purpose, I chose a MaxCim MaxNeo-13D with a planetary gearbox (3.7:1). When it and 14-1700SCR cells are stuffed into the Aurum, the all-up weight is 5.8 pounds, and when propped with a 12x8 APC prop, the MaxCim provides more than enough power.

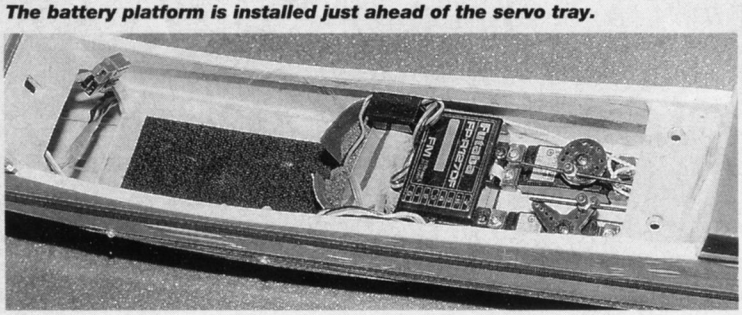
To do the conversion, I had to change a few things. First, I laid a 3⁄32-inch ply battery platform just ahead of the servo tray. Velcro®-brand fastener was added to hold the battery in place. I opened up a hole in the firewall to allow some airflow through the fuselage to cool the cells and another just behind the wing as an exit. I simply used MaxCim's firewall engine mount to hold the motor in place. That was it for the conversion.

Like Gerry, I replaced the wing bolts supplied with the kit with larger-diameter nylon bolts. Unlike Gerry, I installed wheel pants, as they improve the looks of the airplane in my view. If you're flying off tall grass, however, it's best to leave them off.



MaxCim MaxNEO-13D is mounted right on the firewall with the MaxCim mount. Note the air vent cut in the bottom of the firewall.

The battery platform is installed just ahead of the servo tray.



I don't have many flights on the Aurum yet, but it seems to be an honest airplane. Right now I get 5-minute flights with the plane, but I expect to extend that a bit as I become more used to it and learn more about throttle management of this setup. Even at 6 pounds, the plane is capable of most sport aerobatic maneuvers. My plan at this point is to add at least one more cell, switch to 2000mAh cells and try an 11x10 prop. The switch to 2000mAh cells should increase duration by about 20 percent, and the extra cell and smaller, deeper-pitch prop should increase the flight speed. Besides, it's fun to do these little experiments.

—Larry Marshall

MODEL AIRPLANE NEWS

FIELD & BENCH REVIEW

From the box to the field in record time!

CERMARK Easy Electro-72

by ROBERT VAN TASSEL

CERMARK® CLAIMS that the Easy Electro-72 can go "from the box to the field in 20 minutes." Sounded impossible to me, but I'm always up for a friendly wager. I realized that I should have placed my money on Cermark as soon as I opened the box. You don't build this glider; you assemble it!

The Easy Electro-72 came well packed and protected. (By the way, don't throw away the box, as you can disassemble the glider and put it back into it for storage and transportation.) Included is a seven-page instruction booklet that has some very interesting suggestions; take the time to read it, even if you've been around for a while.

The fuselage is white ABS plastic and has cooling vents molded in. The intakes are just behind the prop on the lower side of the fuselage, and the exhausts are just behind the wing area. The wings and tail feathers are violet with white plastic tips, and the canopy is purple. These colors are very visible at the field.

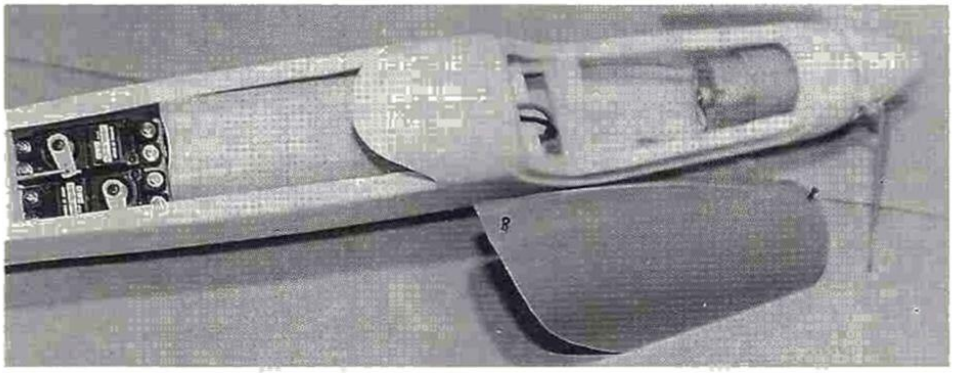
I decided to use my Futaba* 4-channel radio with motor speed control, as it saves space and weight by eliminating the need for a separate speed controller and receiver battery.

Two GWS servos and pushrods come installed on a lite-ply tray in the fuselage. The tray also acts as a shelf for a 6- or 7-cell battery pack that you can access through the canopy, which is held in place by two very small screws. It's a tight fit for a 1500mAh pack, and I didn't need to use the piece of Velcro®-brand fastener supplied to hold the pack in place.

I used Sermos* connectors on the motor. Be careful! The white wire is positive; the light blue wire is negative. Slots for the radio and arming switches are molded into the fuselage. I installed a fuse for protection.

The stabilizer and fin are held in place with two long bolts that run through the bottom of the fuselage. The rudder and elevator come hinged and with the control horns installed; you only have to connect the snap links. I connected the rudder and elevator to the middle servo-arm holes. I had binding on one stabilizer tip and adjusted it.

The wings are covered with a sleeve of PVC plastic that has been shrunk into place. The covering was drum tight without the slightest hint of a wrinkle, although it was somewhat brittle and didn't adhere to the structure in some areas. The model comes with an extra



Two servos and pushrods come installed on a lite-ply tray in the fuselage. The tray is also a shelf for a 6-or 7-cell battery pack that is accessed by removing the plastic canopy, which is held in place with two small screws. The Mabuchi 550 direct-drive motor, spinner and folding propeller are supplied in the kit.

SPECIFICATIONS

Model: Easy Electro-72

Type: ARF electric glider

Manufacturer: Cermark

Wingspan: 72 in.

Wing area: 522 in.

Weight: 45 oz. with 6-cell 1500mAh pack

Wing loading: 12.4 oz./sq. ft.

Airfoil: flat-bottom

Wing chord: 7¼ in.

Length: 40 in.

Motor: Mabuchi 550 direct drive (supplied)

Prop: 8x4 folding (supplied)

Radio req'd: 2- or 3-channel (rudder and elevator; speed controller optional)

Radio used: Futaba Attack 4 with built-in electric speed controller in receiver

List price: $229

Features: this ARF model comes with servos, pushrods, motor and prop installed.

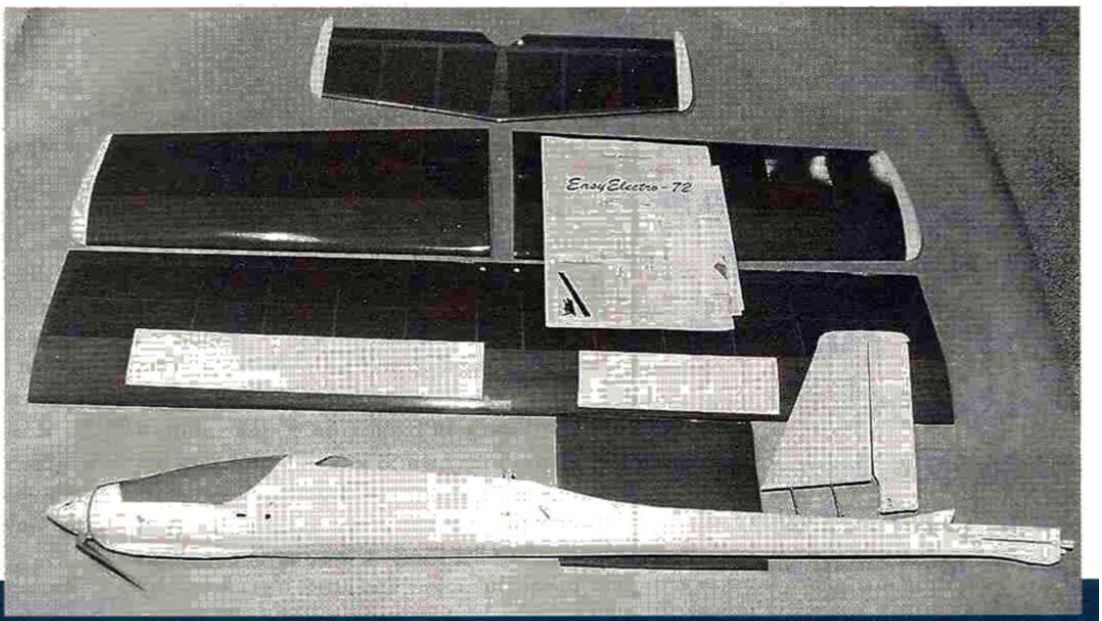
Comments: the Easy Electro-72 is geared for Sunday flyers and beginners. I intend to use it as a vacation glider because it can be taken apart and returned to the box in a matter of minutes.

Hits

- Easy assembly.
- Good assembly booklet.
- Good flight characteristics.
- Replacement parts available.

Misses

- Plastic covering material is brittle and doesn't adhere well to structure.



The Easy Electro-72 comes with all the parts seen here; basically, everything you'll need to assemble the model. The Electro-72 is also easy to disassemble for storage or travel.

FLIGHT PERFORMANCE

My friend Jim Onorato and I started our flying day with ideal conditions and a 0 to 5mph wind. Most of the testing was done under these conditions. Later, the wind picked up to about 20mph, and we eventually quit when we stalled a glider on final and broke a wingtip.

We had two Easy Electro-72s. Jim's glider had an on/off switch to control the motor and a receiver battery pack. The gliders flew equally well, but I noticed the glider with the speed controller performed better—especially when the wind picked up.

We had about 10 flights between the two using 1500mAh packs and 6 and 7 cells. The only difference we noticed was a little more speed with the 7-cell pack.

We launched the Easy Electro-72 above our heads with the motor running full. The glider went out about 20 feet and gradually settled to about 5 feet before the prop took over and it began a steady climb. The climb was constant with a touch of up-elevator. At about 100 feet out, it had reached a comfortable altitude.

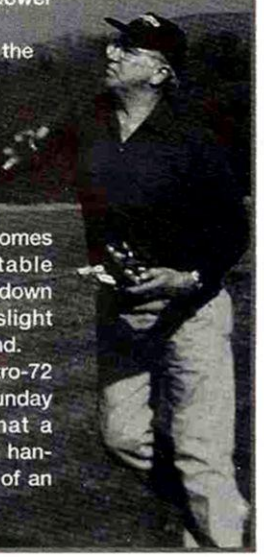
The glider needed no trim correction. However, during the first flight, it was overly sensitive to elevator correction. Moving the snap connector to the outside hole on the control horn corrected this. At about a 75-foot altitude, I used small inputs with a touch of up-elevator, and as soon as it started to respond, I centered the stick. This resulted in a gradual turn. A couple of times, I over-controlled the turns and found the glider sensitive to rudder input.

I kept the glider in a slow gradual turn. It soon reached about 300 feet in altitude, and I turned the motor off. The transition to glide was seamless. With the motor off, the glider moved forward briskly in a very slight descent. You can cover a lot of ground this way in search of thermals.

A little up-trim slowed the forward movement; this would be ideal for the novice flyer. During the afternoon, as the wind picked up and with the motor off, the glider actually flew backward. It showed no bad characteristics while gliding around. Just remember to keep the speed up for rudder control and keep the turns shallow. We didn't find any thermal activity, but judging by its flight characteristics, the Electro-72 will be a good thermal soarer. We got at least three climbs on each charge and had enough power left for landings.

On final, keep the flying speed up and come in on a 10- to 15-degree angle to keep the rudder responsive. The glider comes in at a comfortable speed, and touchdown requires only a slight flare at the very end.

The Easy Electro-72 is an excellent Sunday flyer and one that a novice can easily handle with the help of an instructor.



sleeve of plastic that you can use for repairs. Take care if you shrink the plastic or take out wrinkles; use a hair dryer, and start at least 15 inches away from the film because it shrinks quickly. If you use too much heat, you can warp the structure. Don't use an iron, as there is no glue on the plastic to activate.

The wing comes in three sections that can be permanently joined, or assembled so that the tips will be removable. Two steel pins in each wingtip slide snugly into holes in each side of the inboard panel. I decided to glue the pins into the inboard section, as I could picture myself crawling around in the grass at the field looking for them. Clear tape (supplied) covers the joints and holds them securely.

The leading edge of the center panel has a small brass grommet that slides over a brass machine screw to secure the front edge in place. The trailing edge is held down with two nylon bolts through the reinforced section on the center panel. The slotted nylon bolts have fillets at the end of the slots to prevent your screwdriver from slipping out and damaging the wings—a nice touch! I set the CG at 25 percent from the leading edge, applied the logo and was ready to fly.

How long did all this take? Well, I didn't time myself, but if I went over 20 minutes, it wasn't by much. See you at the field!

**Addresses are listed alphabetically in the Index of Manufacturers on page 142.*

MODEL AIRPLANE NEWS

FIELD & BENCH REVIEW

Easy-build, scale Speed 400 model

RYAN AIRCRAFT

F6F Hellcat

PHOTOS BY GREG GIMLICK

by GREG GIMLICK

WITHOUT A DOUBT, the Speed 400 class is one of the most rapidly growing in the electric flight movement, partly because of the planes' convenience and low cost and partly because of their "cute" factor. The Ryan* Hellcat (also distributed by New Creations R/C*) rates extremely high in the latter category. We've started to see some nice scale Speed 400 models in the last year or so, and this is certainly one of the nicest and most unique designs I've seen. Its uniqueness comes from the designer's philosophy of how to construct a strong, light model and the subject itself.

The F6F Hellcat was a WW II Navy fighter completely designed and manufactured after Pearl Harbor, and it was produced in numbers exceeding 12,000. Add to that its major victory in the Battle of the Philippine Sea, and you have an interesting subject with a great deal of history. I must admit that curiosity got the better of me when I first heard of the kit because it seemed to go against the common trend in Speed 400 design by not only using a scale subject, but also using one with an obviously chunky, round, blunt nose.

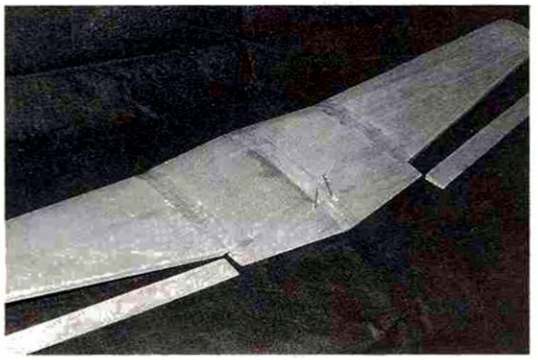
Everything except hardware is provided (and I usually prefer to choose that myself). The plans are folded and depict all parts, and although the instructions are not illustrated, they are very clear and concise. This kit is not for first-time builders or flyers, but with a bit of advice, I think anyone could follow the instructions and come out with good results. Let's dive in and get started.

FLIGHT PERFORMANCE

Prior to flying, I set the CG up at the 2 1/2-inch mark as shown on the plans and ended up with an extremely touchy airplane that gave me quite a scare. Because it's such a small plane, its CG range is very small and I was definitely at the rear end of it, so I landed to adjust it by moving the battery pack forward. Once that had been done and the plane was stable, I checked it on my CG machine and found it to be rock steady at 2 1/8 inch. I recommend starting with that and moving it back, if you want to, after a few flights. Control throws are listed on the plans, and I reduced them a bit after the first flight, but everyone has his own tastes, and the listed throws are manageable.

• *Takeoff and landing*

Like most low-wing airplanes, the Hellcat is not the easiest to hold, and the 1/32-inch sheeting on the belly pan is not built for a ham-fisted grab, so go easy. I found there was plenty of power for the hand toss, and it can be launched from a stand-still with a solid throw. Launching by yourself after the initial test flights becomes routine, and the climbout on 8 cells will really amaze you. There was no problem on the standard 7-cell setup, but I did put a bit more into the throw for that. Landings are uneventful, and you'll find the nose design is very strong, which is a good thing because that big ole blunt nose is the first thing to hit. At one field, it stopped abruptly when it slid into a big clod of turf, but there wasn't any damage.



The sheeted wing is joined and ready to cover.

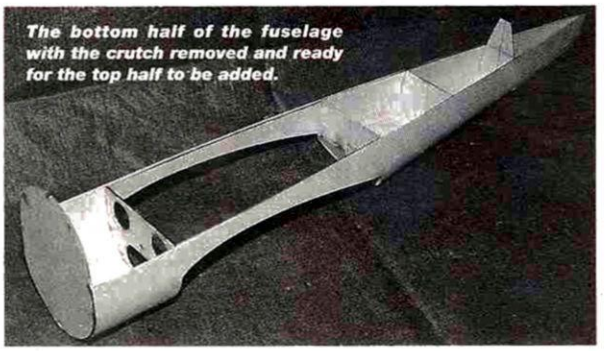
WING CONSTRUCTION

The foam-cores are neatly done with razor-sharp trailing edges and need only a light sanding and vacuuming to be ready for covering with 1/32-inch balsa. I laminated the balsa with 3M Super 77, but any of the usual laminating techniques will work.

The F6F has a flat center section and polyhedral joints midway out along the wing, so construction begins with cutting the cores at the polyhedral joints and sanding them to the appropriate angle. Before gluing the wing-cores together, cut the ailerons out and face the leading and trailing edges with balsa. The panels are joined using foam-friendly glue and reinforced with fiberglass tape. Slots for the torque rods for the ailerons are cut into the bottom of the wing and the rods are glued into place, then the slots are filled with balsa. Now your wing is nearly complete, and you've spent only one evening at the bench.

FUSELAGE CONSTRUCTION

This is the only section that may seem strange to some folks, as the fuselage is built in top and bottom halves using a crutch system. This method is often used in designs that sport a round fuselage, and it works well, but it will require a bit of study and thought if you've never done it. The instructions clearly describe each step, and the plans show the crutch, which is made out of some scrap hard balsa you supply. Be sure to mark everything as shown on the plans, and the parts will line up perfectly to reward you with a nice straight fuselage. Be sure not to glue the formers to the crutch so you can't remove them because once the bottom half is complete, you'll need to pop the crutch out and glue the top half to it.



The bottom half of the fuselage with the crutch removed and ready for the top half to be added.

Because the model doesn't have landing gear, you will need to reinforce the area between the front two formers with some light fiberglass cloth to give the nose the strength it needs to withstand landing forces. That's done after the bottom fuselage half has been sheeted with the supplied balsa. The instructions describe how to dampen the balsa to more easily bend it around the fuselage, but I found that it wasn't necessary, and had no trouble bending the dry 1/32-inch sheet to fit. As you build the tail of the fuselage, you'll have to make a T out of some scrap 1/8-inch balsa to simulate the tail feathers so you'll be able to carve the fillets to shape. This system works great, and when it's time to fit the actual empennage, you'll find

SPECIFICATIONS

Model: F6F Hellcat

Type: Speed 400 scale

Manufacturer: Ryan Aircraft

Wing area: 168 sq. in.

Wingspan: 30 in.

Length: 23 in.

Weight: 18 oz.

Wing loading: 15.5 oz./sq. ft.

Rec. power: Speed 400 6V motor on 7 or 8 cells

Radio req'd: 3-channel (throttle, aileron and elevator)

Radio used: Futaba* 8UAF, RCD 535 micro-receiver, Hitec* HS-80 servos

List price: $75

Features: foam-core wings; laser-cut parts; frisket for canopy frames; full-size plans with templates; thorough instructions; precut nose cowl.

Comments: the F6F has classic good looks and flies exceptionally well. The construction techniques provide a very strong and light airframe.

Hits
- Good balsa quality and parts fit.
- Scale appearance.
- Nice flight characteristics.
- Frisket for canopy supplied.

Misses
- CG location on plans not accurate.

• *High-speed performance*

With 8 cells driving the 6V motor and 6x4 prop, I found the Hellcat's speed to be remarkable. My computer projected a speed of 52mph; the Hellcat seemed to fly that fast and became very small in no time. Controls are solid, and turns will quickly become pylon turns once you're comfortable with the plane. I can definitely see some F6F pylon racing in my future.

• *Low-speed performance*

Control authority was better than I expected at slow speeds, and the stall characteristics are very gentle, no doubt due to the washout built into the foam-cores. I was able to throttle back to a stall holding full up-elevator, and the model abruptly dropped its nose but kept going straight ahead. I held the elevator in and watched it stair step to the next stall and drop its nose again, but not a wingtip. Recovery was simply a matter of flying it out with a bit of airspeed. This makes landing this plane much less frightening than landing some of my other Speed 400 planes, but you'll do well to fly it all the way to the ground and not expect it to just settle in the last couple of feet.

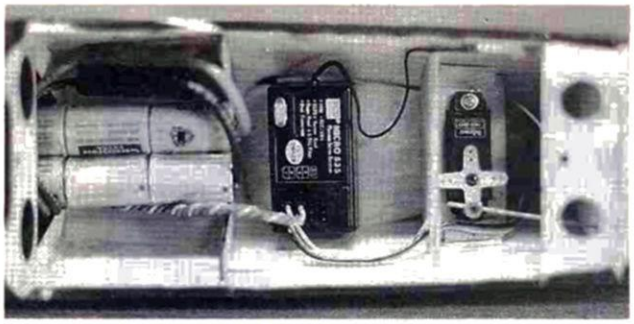
• *Aerobatics*

This isn't an Extra, but its aerobatic capabilities will surprise you and, as I found out at primarily glow fields, many others as well. You won't be able to do knife-edge (no rudder), but loops, rolls and Cuban-8s are big and grand. If you do manage to get into a spin—or sort of a spin—the model will recover easily with throttle and aileron. Split S's are its forte, and you can feel the adrenaline flow with a few gun runs and return to target turns.

the parts fit together very nicely.

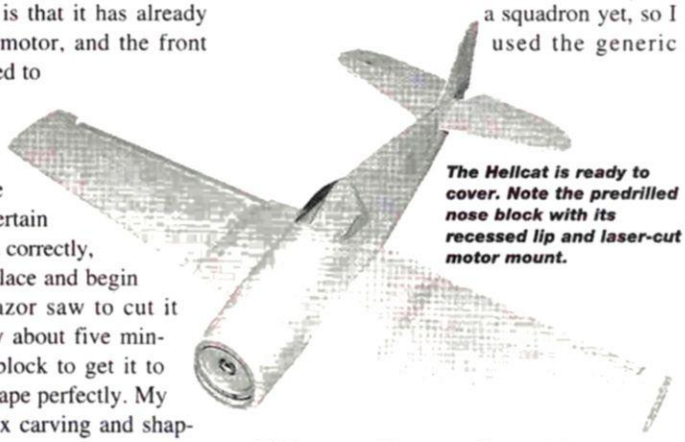
EMPENNAGE AND COWL BLOCK

The tail feathers are simple 1/8-inch-balsa sheet stock that has been laser-cut to shape. After trial-fitting them, set them aside and glue the vertical stab into place just prior to covering. I covered my horizontal stab before gluing it into place.



The motor battery, receiver and elevator servo fit easily inside the fuselage.

When I saw the big chunk of balsa used for the nose cowl, I thought, "Oh no—a bunch of carving," but fear not; the balsa is of consistent density and is easily carved to shape. The best part is that it has already been drilled for the motor, and the front has been counter-bored to provide a shoulder for the laser-cut motor mount. Once you've marked the centerlines and are certain the block is positioned correctly, you can glue it into place and begin to carve. I used a razor saw to cut it down, so it took only about five minutes with a sanding block to get it to match the fuselage shape perfectly. My biggest fear—complex carving and shaping—was averted.



The Hellcat is ready to cover. Note the predrilled nose block with its recessed lip and laser-cut motor mount.

WING INSTALLATION AND BELLY PAN

Extra time and effort during this step will be well spent; I found the belly pan to be the most difficult part of the model. The wing is held in place by a single 6-32 screw in the back and a dowel in the front, so there's nothing new to learn here. Once the back has been screwed into place, you can drill the front dowel hole and glue the dowel in. The belly-pan formers are then glued to the wing and sheeted. This was the hard part for me only because I wanted the sheeting to fit precisely, and it took a bit of time to get it right. Nothing odd or new, just slow going to get a nice job. Don't forget to cut a hole in the sheeting once it has been completed so you'll be able to access your wing-mounting screw.

FINISHING

The instructions recommend that you finish the plane before you install the radio gear, and this was a change for me, but given the size of the plane and the simplicity of the control setups, it proved to be good advice. I covered my plane with dark blue TowerKote* (which cost only $6!). I used covering to make the aileron hinges, but they can be made using any method you're comfortable with. I haven't chosen a squadron yet, so I used the generic F6F stars and bars cut from white Ultracote*. After everything had been covered and the stab had been glued into place, I positioned the radio gear as depicted on the plans and then was ready to fly.

SUMMARY

This is one of the nicest Speed 400 scale entries I've seen come on the market lately. The design is clean and accurate, as are the excellent selection of balsa and the laser cutting. Every now and then, you get a new "favorite plane," and right now, this has to be mine. I've flown it in 20-kilometer winds where a gust literally stopped it in flight at 2/3 throttle, yet I was able to continue by merely advancing the throttle. My Hellcat is a bit over the target weight of 18 ounces because I added a cockpit floor and pilot, but the extra 6/10 ounce doesn't seem to make a difference, and it flies almost as well on 7 cells as it does on 8. If you want a scale plane that is accurate and will take only a few evenings to build, you won't go wrong with this one.

**Addresses are listed alphabetically in the Index of Manufacturers on page 142.*

INDOOR FREE *Flying*

by LARRY MARSHALL

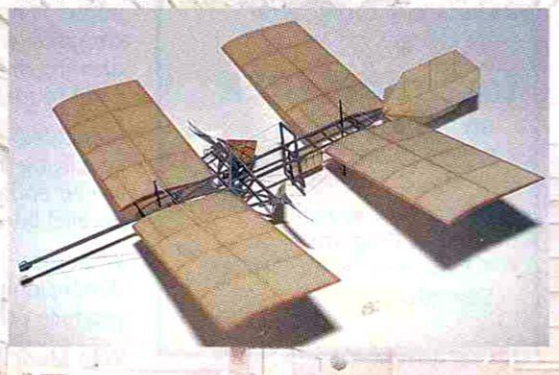
THERE'S A GROWING interest in things small in model aviation. While large R/C planes are still popular, more and more guys are also flying small planes, enjoying their simplicity, low cost and the ability to fly them anywhere. At the same time, there's a growing interest in scale. Even sport flyers now prefer to fly a model that looks like the real thing. A trend that is less evident, mostly because many of our magazines have become R/C only, is that free flight scale is growing by leaps and bounds. It's being driven by groups of guys who enjoy flying free flight models; guys who enjoy taking advantage of the inexpensive nature of these models such that they can build and attempt to fly many designs that would be considered too hard, too complex or too impractical for an R/C model. These guys are being joined by R/C flyers all over the planet who are finding free flight to be an interesting challenge. They realize that R/C is not a "step up" but rather that R/C and free flight have their own virtues and that enjoying model aviation at its fullest means doing both.

Stu Richmond's dime scale Puss Moth has a functional shock-absorbing landing gear and flies great at 8.9 grams.

These planes are flown outdoors during the summer and indoors in winter. As the outdoor sites have become smaller, people have started to take advantage of the new micro-radio gear that's now available to provide "R/C assisted" free flight, in which the R/C gear is used largely to direct the plane home when it ventures off-field. In addition, the lightweight gear is spawning a group of flyers who are interested in indoor R/C. They fly very lightly loaded electric-powered models in school gymnasiums, experimenting with and/or buying one of the few indoor R/C models available from Hobby Lobby and Clancy Aviation.

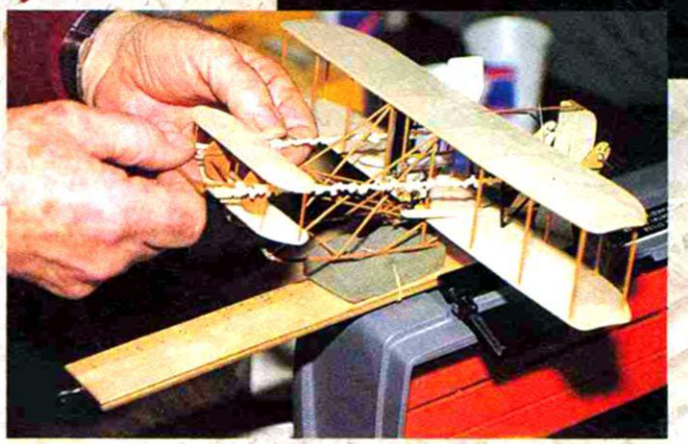
These activities are blurring the very boundaries of R/C and free flight. The common interest in scale further minimizes any differences. For these reasons, we at *Model Airplane News* have decided to return to a format that includes some coverage of free flight. So come with me to Buffalo, where the free flight guys had a little fun one weekend.

Flying Aces guys see scale models like this as a challenge.



Left to right: Greg Gallo built this Flybean Special, a Golden Age racer, from a Flying Aces plan; here's Greg again, prepping his Herr Engineering Fokker DVII for a flight; James DeTar is stuffing a new motor into his Herr Engineering Aeronca Champ. He turned the wheels from balsa and, as is the case with many of the models, the prop is homemade; this is where the concepts of elegance and complexity converge—the intermediate stick class of indoor free flight; Bob Clemens is the guy who made it all happen. He's also a heck of a nice guy who builds some mighty fine airplanes.

FLIGHT, *Aces Style*



Talk about patience and a keen eye! Don Steeb built and flew this stunning Wright Flyer. The incredible thing is that not only does it look great, but it flies, too! Of course, an FAC'er wouldn't have it any other way.

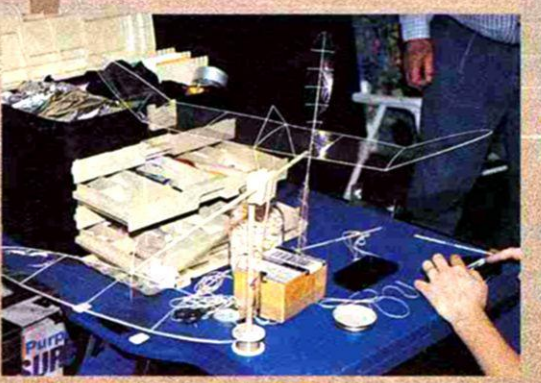
Much of indoor free flight takes place in school gymnasiums, but whenever someone "scores" a big site, it's not tough to get folks interested in flying. So it was in Buffalo, when Bob Clemens of the Western New York Free Flight Society, along with the Flying Aces, managed to get the Buffalo Bills training facility for the day. This is a big building, folks; it houses a football field under a 128-foot ceiling. When I entered this facility, a big piece of me wished I was hauling airplanes rather than a camera. But the guys put on such a show and were so nice that I didn't feel too left out.

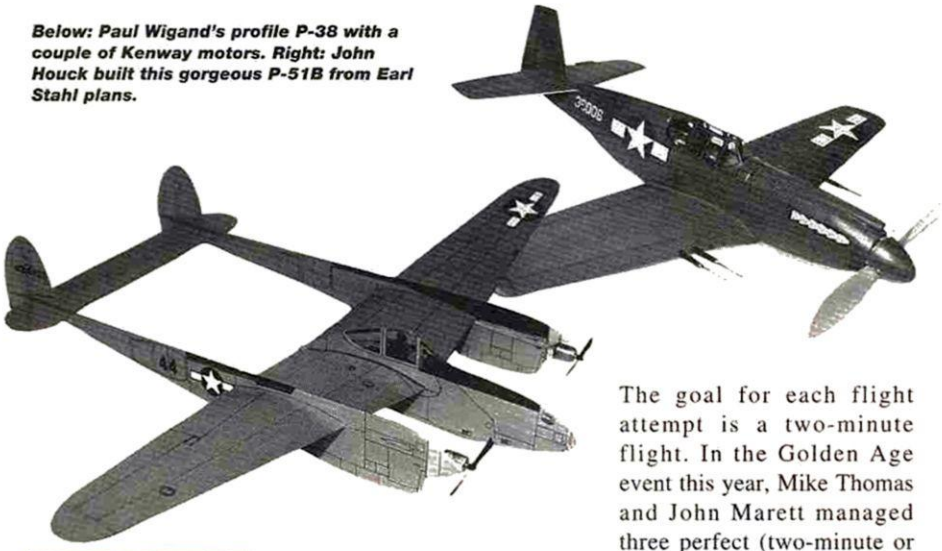
Along with the traditional mini sticks, pennyplanes and other gossamer indoor models were the free flight scale events. This meet featured 14 classes, and most were well represented. One of the funny things about free flighters is that while they fly small airplanes, they still drive big vans like the giant scalers so that they can transport a dozen or more models to an event. So in spite of there being eight scale events (generally divided by aircraft type and size), each event had many contestants, and that results in a sky filled with aircraft most of the time, making it fun to watch.

Paul Wigand flew the wings off this profile ME-163. Powered by a Kenway motor and a couple of 50mAh cells, it's a bundle of fun in a small package.

From the master, Jack McGillivray, comes this SE5. Although it weighs next to nothing, it has all its flying wires, a scale Lewis gun and a very scale paint job.

Flying Aces events vary a bit from event to event with respect to the rules. Typically, the planes are static judged and then three flights are made, with points accumulated for seconds of flight time. Bonus points are awarded to those aircraft sporting more than one wing, multi-engine aircraft, etc., and this increases the diversity of aircraft being entered.

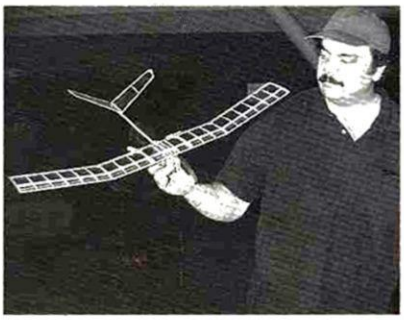




Below: Paul Wigand's profile P-38 with a couple of Kenway motors. Right: John Houck built this gorgeous P-51B from Earl Stahl plans.

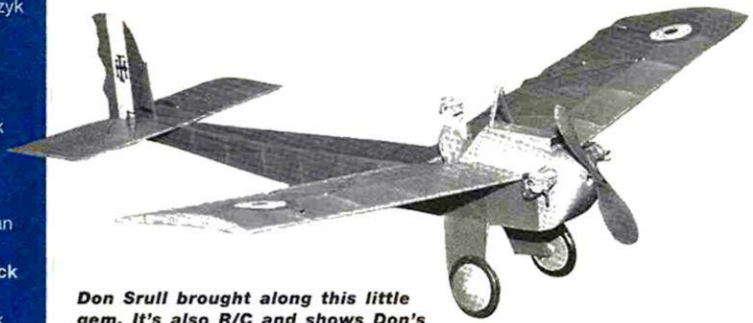
The goal for each flight attempt is a two-minute flight. In the Golden Age event this year, Mike Thomas and John Marett managed three perfect (two-minute or more) flights, and a flyoff determined the winner. Mike won with a flight that exceeded four minutes. As I've mentioned, free flight is a world where guys believe no scale model is impossible, and Dave Steeb of Rochester, NY, typifies that approach. He was there, flying his rubber-powered Wright Flyer. This model was just too cool for words.

Jack McGillivray came down from Canada to show off his legendary free flight scale talents. We kid Jack about his use of helium-filled balsa, but the truth is, he just uses less balsa than the rest of us. His SE5a is a sight to behold, but at this meet, he put in some incredible flights with a pristine "Arado" built from old Comet plans. He won the Dime Scale event with this plane ... and the Peanut event with a Spitfire ... and the Thompson/Greve Race with his R-4 ... and FAC Scale with his SE5a. As I said, Jack knows what he's doing.



Ken Bassett, who sells Kenway motors, was flying this small indoor R/C plane powered by two of his motor systems.

Electric-powered models, both free flight and R/C, are becoming very popular. A special event held at Buffalo was a free flight duration event for electric power. Electric motors from Ken Bassett, owner of Kenway Motors*, dominated this competition. So did Thistles, a small plane published in *Model Aviation* a few



Don Srull brought along this little gem. It's also R/C and shows Don's flair for making airplanes look great. It's a 3-channel, electric-powered plane that, while Don made a short flight indoors, is better suited for outdoor flying.

AMA EVENTS

Bostonian Cabin
1 Richard Miller
2 John Marett
3 Chris Brownhill
4 Jim Lee
5 Mike Thomas
6 Walt Kornrich
7 Bert Phillips
8 Pete Azure

Unlimited Electric
1 Dan Hurd
2 Mark Whalen
3 Clarence Hurd

Mini Stick
1 Tom Sova
2 Walt VanGorder
3 Larry Mzik
4 Ken Mark
5 Bill Henderson
6 Ed Archer
7 Vernon Neff
8 Don Steeb

Limited Pennyplane
1 Dan O'Grady
2 John Marett
3 John Kagen
4 Pete Olshefsky
5 Jim Sonnenmeier
6 Walt VanGorder
7 Greg Gallo
8 Larry Loucka
9 Chuck Slusarczyk
10 Vern Hacker

Easy B
1 Tom Sova
2 Don Slusarczyk
3 Fred Tellier
4 Larry Mzic
5 Ed Archer
6 Anthony Nguyan

Intermediate Stick
1 Larry Loucka
2 Don Slusarczyk
3 Tom Sova
4 Fred Tellier

INDOOR R/C WITH DON SRULL

Don Srull is an icon in the world of free flight scale. At last count, he has won 184 Flying Aces events, and his craftsmanship is such that his flying aircraft would look right at home among museum display models. But Don is also a generalist; an experimenter.

So it's not surprising that Don put together his own entry to the world of indoor R/C. This part of our hobby is just starting to take off on this continent, though it has been very popular in Europe for some time. In spite of his success in competition, Don has always seemed pretty laid back about it. At Buffalo, he set something of a record by flying his indoor R/C plane for an hour and a half (he landed because he was getting hungry!). It was clear that he could have stayed aloft much longer.

Don's plane spans 40 inches and has 300 square inches of wing area. Without the battery, it weighs 60 grams (just a tad over 2 ounces). When he flies with three 3V-lithium cells, the all-up weight is 95 grams. The motor is a West-Technik DC 5-2.4 with an 8:1 gear ratio. He controls it with a Garrett receiver, a West-Technik controller and two West-Technik 6-gram servos. All of this equipment is available from Andy Clancy of Clancy Aviation*.

FLYING ACES

In the '30s, kids could buy models everywhere, including the local drugstores. Many of them cost only 10 cents. This was a very special era in model aviation, when oil companies sponsored "The Adventures of Jimmy Allen" on the radio to get kids to coerce their folks into buying Skelly Oil products. Kids could join the Jimmy Allen Flying Club and when dad bought gas, they could get a "flight lesson." After completing five flight lessons, the kid would take a final exam and then receive a model airplane.

Skelly Oil wasn't the only organization using model aviation as a marketing tactic. William Randolph Hearst (the Hearst Publishing mogul) established the Junior Birdmen and produced handbooks on the building and flying of model airplanes. This organization became half a million strong during the mid-'30s. Many other organizations existed, all with large memberships. The Chicago Times had the Sky Cadets, Air Trails had the Air Adventurers, and *Model Airplane News* sponsored the American Sky Cadets.

But the group we remember most is the Flying Aces. The reason is that in 1976, Dave Stott and John Thompson decided that flying some of the dime scale models of the '30s would be fun. Their activities led to the founding of what has become a large organization—the Flying Aces.

The popularity of the Flying Aces today could not have been predicted back in the '70s. More and more modelers find that building small free flight scale aircraft is very enjoyable. I've been a member for a long time and although I've never had much in the way of a place to fly free flight, the many available plans allow me to investigate some of the many scale aircraft that I'll never be able to build as R/C's planes. Even with a small field, you can fly free flight early in the morning or late in the afternoon without too much chance of a thermal stealing your plane away. Many R/C'ers have become diehard free flighters once they find the pleasure of "trusting" their aircraft.

Lin Reichel, our leader.

Today, the membership of the Flying Aces is in the thousands. The Flying Aces Nationals, held in Geneseo, NY, in July, has become a three-day event and, for a scale nut, it's the best place on the planet to be because there are several hundred scale models on the field. Because of the bonus-points system used, the variety of these models surpasses anything found at an R/C meet.

With the recent flurry of laser-cut kit releases from companies like Herr Engineering* and Dumas*, getting into this fun area of model aviation has become easy. But most of all, if you have any itch to build a free flight scale plane, you've just got to scratch it by becoming a member of the Aces. The cost is only $15 a year, and you get a bimonthly newsletter with all sorts of good info in it, as well as three to four full-size plans for free flight scale aircraft. Send a check to Lin Reichel, Flying Aces, 3301 Cindy Ln., Erie, PA 16506.

years ago. Dan Hurd did 11 minutes with a Thistle powered by a Kenway motor and current controlled by his own voltage-regulation circuit.

If you're looking for something fun to do with a bunch of guys who are fun to be with, make plans to be in Buffalo next spring for the second running of this great meet.

*Addresses are listed alphabetically in the Index of Manufacturers on page 142.

This was Jack McGillivray's dime-scale entry. It's built from a Comet Arado plan in Jack's light, crisp style. It flew magnificently, and Jack won the event with this plane.

FLYING ACES EVENTS

GOLDEN AGE SCALE

1	Mike Thomas	Cub
2	John Marett	Leopard Moth
3	Bill Henderson	Focke-Wulf A17A
4	Don Srull	Mureaux
5	John Houck	Rearwin Sportster
6	Pete Azure	Fairchild 24

THOMPSON/GREVE RACE

1	Jack McGillivray	R-4 Jack Rabbit
2	Greg Gallo	Floyd Bean Special
3	Don Srull	R-4 Jack Rabbit
4	John Houck	Art Chester Jeep

WORLD WAR II

1	Greg Gallo	P-40C
2	Jack McGillivray	Spitfire
3	John Houck	P-51A
4	Vern Neff	P-40C

NO CAL SCALE

1	Don Steeb	Folkerts
2	Chuck Slusarczyk	Cassutt
3	Don Steeb	Mr. Smoothie
4	Bill Henderson	Hosler Fury
5	Don Slusarczyk	Cassutt
6	Chris Brownhill	Lacey M10
7	David Rosenberg	Mr. Smoothie
8	Bob Clemens	P-63 King Cobra
9	Paul Weigand	Hughes Racer
10	Paul Savage	P-51
11	Ed Archer	Bonzo
12	Mike Thomas	Hosler Fury
13	John Houck	TBD-1
14	Pete Azure	Waterman Gosling
15	Mardean Moyer	Bebe Jodel

DIME SCALE

1	Jack McGillivray	Arado
2	Don Steeb	Fokker D-VII
3	Stu Meyers	Curtiss Robin
4	Pete Azure	Spitfire
5	Pete Azure	Mr. Mulligan
6	Bert Phillips	Monocoupe
7	John Houck	BT-7

FAC SCALE

1	Jack McGillivray	SE-5
2	Rich Miller	Currie Wet Wot
3	Don Steeb	Kimberly Skyrider
4	Chris Brownhill	Lacey M-10
5	Bob Clemens	Aerodrome
6	Walt Kornrich	Pitcairn
7	Bob Clemens	Farman Mosquito
8	Jim Detar	Aeronca Champ
9	Greg Gallo	Fokker D-VII

POWER SCALE

1	Bob Clemens	Farman Jabiru

FAC PEANUT

1	Jack McGillivray	Spitfire
2	Bill Henderson	Bleriot VII
3	Don Slusarczk	DH-6
4	Bob Clemens	Currie Wot
5	Greg Gallo	Cougar
6	Jim Lee	Lacey M-10
7	Chris Brownhill	Lacey M-10
8	Don Steeb	Wright Flyer
9	Vern Neff	Elias Aircoupe
10	John Houck	Piper Vagabond
11	Bert Phillips	Bellanca

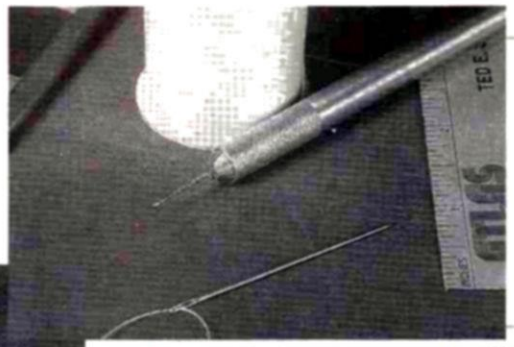
MODEL AIRPLANE NEWS HOW TO

A strong, light solution for small models

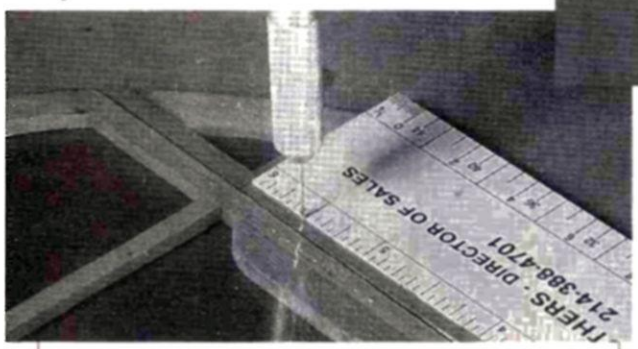
Make Sewn Hinges

by RANDY RANDOLPH

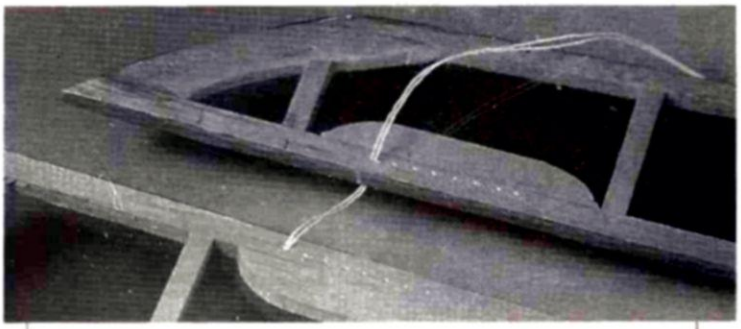
THE INCREASED INTEREST in slow-flight, indoor R/C and small R/C airplanes has made it necessary to hinge control surfaces in a way that offers the least resistance to miniature and sub-miniature servos, as well as magnetic actuators. The hinge that offers the least resistance to movement is one that's sewn with a baseball stitch and silk thread. It's probably the strongest, lightest hinging system available to modelers. The photos show the way.



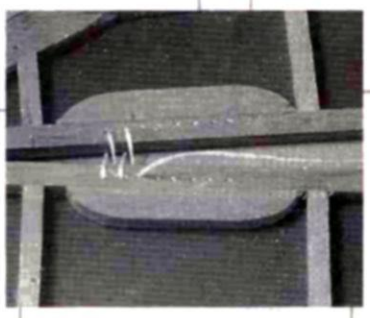
1 The only tools necessary, other than a needle and thread, are a ruler and a pin. The pin is much easier to use if you remove the head and insert it in a pin vise or modeling knife. Both surfaces to be hinged should already be covered.



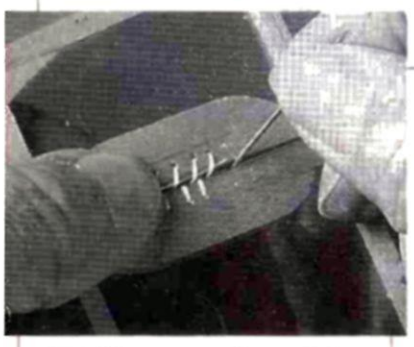
2 The job will be much easier if you pre-punch the needle holes with the pin. Using the ruler as a gauge, punch the holes through the mating surfaces at the hinge locations. One-eighth-inch centers are ideal, and about five or six holes in each surface are usually sufficient.



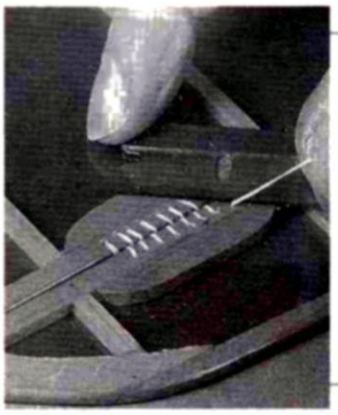
3 Thread the needle with a 12-inch loop of thread and tie a knot in the end of the loop. Start with the first pre-punched hole and insert the needle from the *bottom* of one surface, pulling the thread through until the knot touches the surface.



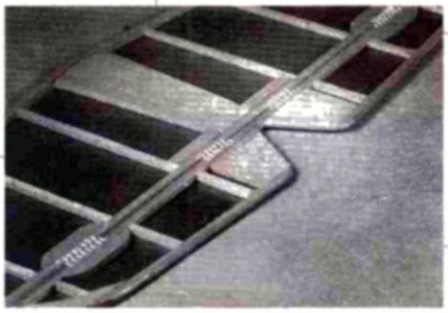
4 Bring the needle between the surfaces and through the *bottom* of the mating surface, then again between the surfaces and through the *bottom* of the first surface. Notice that the stitch always starts at the bottom side of each surface.



5 After two or three stitches, pull the thread up tight and hold the two surfaces in place while you finish sewing them together. The needle will pass easily between the surfaces, and after the last stitch, gently pull the thread to remove any slack.



6 A drop of glue at the knot and end of the last stitch will hold them permanently in place. When the glue has set, trim the thread and the knot flush with the surface.



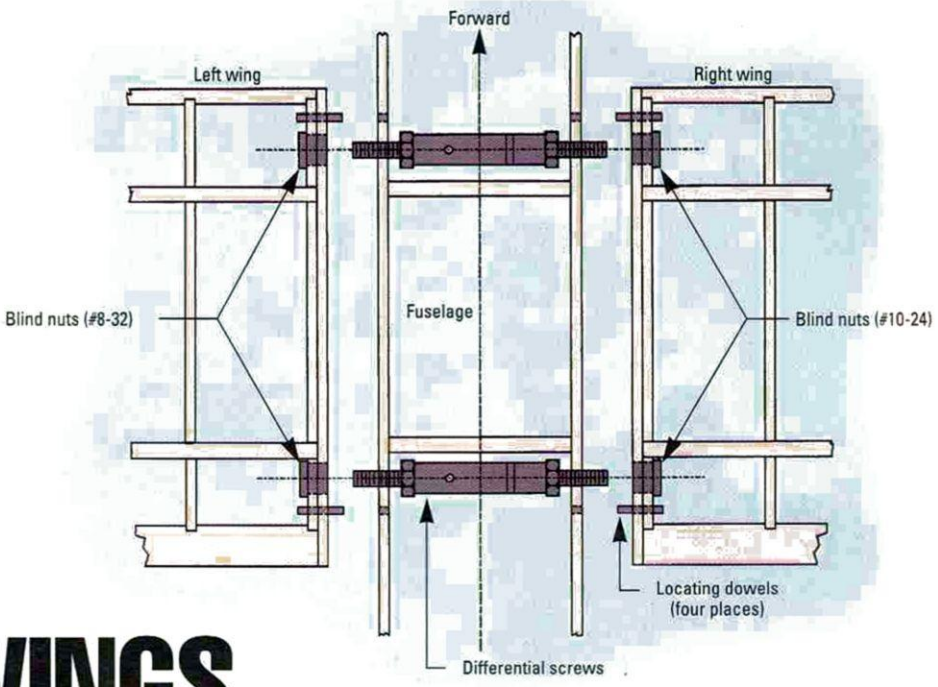
7 The finished hinge line is tight and very free moving. In this case, four sets of hinges do an adequate job on the elevator. Two hinges will usually suffice for the rudder. Although it looks clear, this stab is covered with Oracover* Light Transparent film. The complete hinge job added less than a gram to the total weight of the stab.

**Addresses are listed alphabetically in the Index of Manufacturers on page 142.* ✦

PHOTOS BY RANDY RANDOLPH

MODEL AIRPLANE NEWS
HOW TO

SCHEMATIC OF DIFFERENTIAL SCREW FOR WING MOUNTING



THE WING-MOUNTING method shown on the plans of my 1/4-scale Cub left me cold. After considering turnbuckles and finding only some rather crude and bulky examples on the market, I developed an alternate approach that works surprisingly well and may just be what you need for your next project.

BY AL EHRENFELS

MOUNT WINGS using Differential Screws

The method I use employs a differential screw in place of a turnbuckle. The differential screw is an old engineering concept, and this is merely a new application. Before you snort "So what!" and move on, consider this: it requires no special taps; it uses readily available material; it needs no fancy machining; and it can develop an incredible amount of retaining force.

The accompanying sketch shows an aluminum rod with lengths of threaded rod fitted to each end. Different threads are used on each end, hence the name "differential screw." It can be any combination of threads, providing they are different on each end of the assembly. In my application, 8-32 and 10-24 threads were used, since that's the threaded rod the local hardware store had on hand. The matching blind nuts and the aluminum rod were available at the same place. The blind nuts are sold as "T-nuts" in the local hardware store, so try that moniker if "blind nuts" draws blank stares.

Looking at the drawing of the installation in my Cub, you will see that I used two screws passing through, but floating in, the fuselage. Blind nuts are fitted to the root ribs of the wing, and locater dowels in the root ribs fit matching holes in the fuselage.

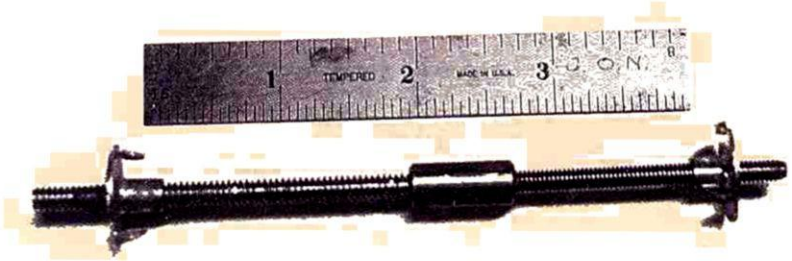
To assemble the plane, I hold the left wing against the side of the fuselage and turn the 8-32 screws into the blind nuts. I screw them in until they are almost flush with the fuselage on the right side. Then I hold the right wing against the fuselage and proceed to turn the screws into the 10-24 blind nuts on the right wing. You might think this would result in my unscrewing the left wing at the same time, but note that the screw is moving into the right wing faster than it is moving out of the left one. That's the secret to this approach.

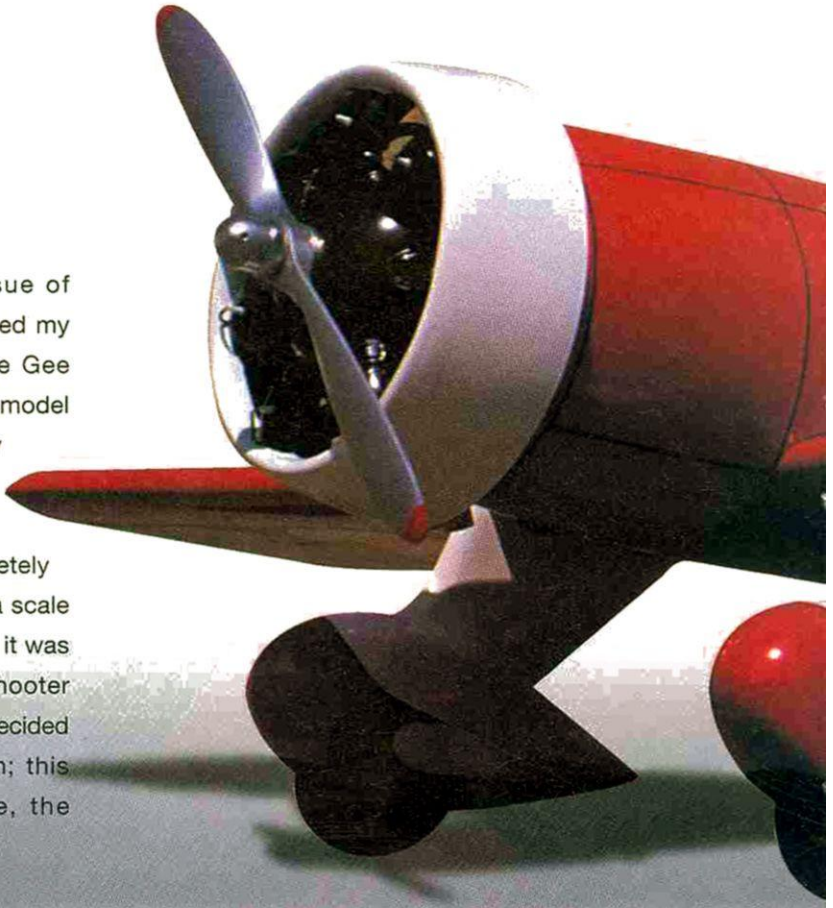
The reason it works so well is clear if we do a little arithmetic. An 8-32 thread has a pitch (advance per turn) of 0.03125 inch, and a 10-24 thread has a pitch of 0.04166 inch. Thus, as I am screwing into the right wing, both wings are being pulled together by 0.0104 inch (0.04166 minus 0.03125 inch) on every turn of the screw, and that's the pitch of a 96-threads-per-inch (tpi) screw. A few turns of the "turnbuckle," and the wings are pulled to the fuselage with the mechanical advantage of a 96tpi screw, and that amounts to about 100 pounds, using only fingertip pressure to tighten the screws.

For the occasions when my hands were slippery with oil, I drilled two cross-holes in the rod so that I could use a short piece of music wire to turn the screws. Go easy, or you'll have a crushed fuselage.

Does it work? My 9-foot Cub can be picked up by the wingtips, struts removed, with virtually no sag. When I recently walked away from a skirmish with a runway marker light (I swear the thing was magnetic!) with only minor cuts and bruises to the Cub, I knew for sure that I had a good thing going with this design.

I recommend it for a simple, but very effective, solution to the problem of attaching wings to your aircraft's fuselage.





by HENRY HAFFKE

THE DECEMBER 1994 issue of *Model Airplane News* featured my article on the Sort-a-Scale Gee Bee Long-Tail Racer. I built this model thinking that there were probably many modelers who'd like to fly a Gee Bee, but because of the aircraft's poor reputation (completely unfounded), were afraid to build a scale version. My "Gentle Gee Bee," as it was called, was based on my Peashooter design and was so popular that I decided to do another simplified design; this time, of my favorite Gee Bee, the Model-Y Senior Sportster.

A GENTLE Gee Bee SENIOR SPORTSTER

PHOTOS BY HENRY HAFFKE & GERRY YARBROUGH

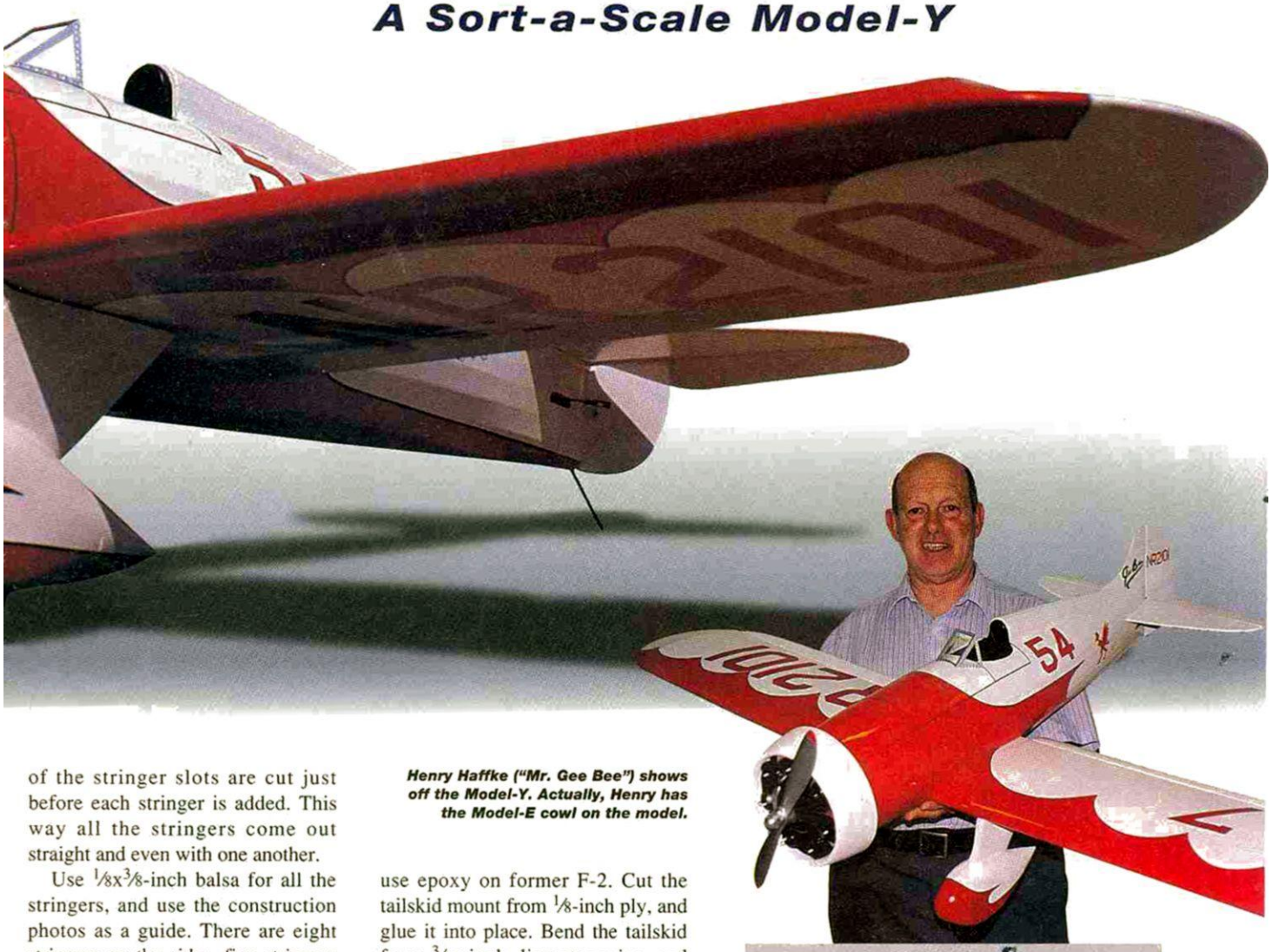
Because of its resemblance to the Model-E Sportster, this model can be finished in any of the four Model-E Sportster schemes. It also somewhat resembles the Boeing P-26 Peashooter military fighter, so it could also be finished with its colorful markings. The color and registration numbers for all Model-E Sportsters are listed on the plans, as is information for the three Model-Y markings.

CONSTRUCTION

• **Fuselage.** Cut the sides from 1/8-inch balsa sheet. The outline for the sides is shown with arrows on the plans. Cut the firewall from 3/16-inch ply and former F-2 from 1/8-inch ply. Former F-1 (two sets are required) is cut from 1/2-inch balsa; all the other formers are cut from 1/8-inch balsa. Note: when cutting out the formers, it is advised to cut only the top and bottom centerline stringer slots in them. It makes a much better job of things if the rest

Even though the Gee Bee Model-Y has a tailskid (no steerable tailwheel), it is very easy to take off and land.

A Sort-a-Scale Model-Y



Henry Haffke ("Mr. Gee Bee") shows off the Model-Y. Actually, Henry has the Model-E cowl on the model.

of the stringer slots are cut just before each stringer is added. This way all the stringers come out straight and even with one another.

Use 1/8x3/8-inch balsa for all the stringers, and use the construction photos as a guide. There are eight stringers on the sides, five stringers on the belly and two stringers on either side of the turtle deck.

Drill holes in the firewall for the engine mount, fuel lines and throttle linkage, then temporarily install the engine mount on the firewall with blind nuts. Remove the engine mount until the basic assembly and covering have been completed.

Mark the former locations on the fuselage sides, then epoxy the fuselage sides into the firewall slots. Do this with the firewall flat on the bench, and keep the sides square to the work surface. When the epoxy has cured, join the sides at the tail post. Next, glue the F-1 parts into place against the backside of the firewall. Cut the balsa wing-saddle doublers from 1/4-inch balsa and glue them into place. Glue the remaining formers into place, and use epoxy on former F-2. Cut the tailskid mount from 1/8-inch ply, and glue it into place. Bend the tailskid from 3/32-inch-diameter wire, and epoxy it into place on the mount. Install the top, bottom and side 1/4-inch-square longerons from formers F-1 to F-3. Now add the top and bottom 1/8x1/4-inch aft, center stringers.

Cut the tail surfaces from 3/16-inch balsa, and join the elevator halves with a length of 1/4x3/16-inch spruce. Test-fit the stab and fin, and where necessary, trim the lower rear part of the fin to fit as snugly as possible between the fuselage sides. Glue the fin into place against F-7 with its bottom resting on the top of the stab (which has not yet been glued into place).

When the fin joint has dried, remove the stab from the structure. Now add the side stringers, cutting slots for one stringer at a time in the

SPECIFICATIONS

Model: Gentle Gee Bee Senior Sportster

Type: Sort-a-Scale Model-Y

Wingspan: 58.25 in.

Length: 43 in.

Weight: 6 lb.

Wing area: 611.6 sq. in.

Wing loading: 22.5 oz./sq. ft.

Airfoil: semisymmetrical

Radio req'd: 4-channel (rudder, ailerons, elevator and throttle)

Engine req'd: .40 to .46 2-stroke, .52 to .56 4-stroke

Engine used: K&B .40 2-stroke

Comments: designed by Henry Haffke, this Gee Bee Model-Y Senior Sportster is the second in the Gentle Gee Bee series of easy-to-fly, good-looking, sport-scale models. It has an all-wood, simplified construction for fast building. Fiberglass wheel pants and an engine cowl are available.

Above: fuselage sides, doublers and formers ready for assembly.

Below: firewall and former F-2 installed. Note the wing-saddle doubler inside.

formers. Taper the inside edge of the stringers at the tail so that they flow smoothly into the tail post. Install the stringers by alternating from one side to the other as each stringer is added. The turtle-deck stringers should also be trimmed to fair into the fin.

Fill in the wing-saddle area between the fuselage sides and the lower stringers with two pieces of ½-inch balsa glued between F-2 and F-4. Epoxy the wing-mount blocks and supports using epoxy to glue them against the saddle doubler. Glue the former F-4BA into place after you have trimmed its top and bottom edges to fit, as shown in the side-view drawing. The bottom stringers can now be added. This is a good time to set up the radio installation. Add the ring-shaped F-1A fairing-block pieces to the front of the F-1 blocks and around the firewall.

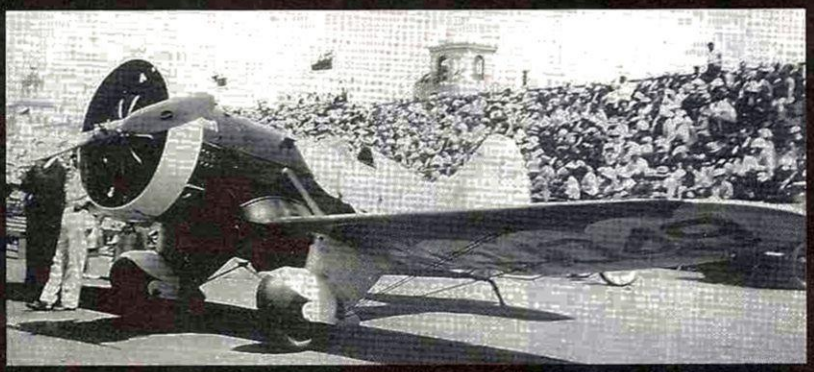
After all the stringers have been added, apply the planking. I plank my models with ⅛x¼-inch balsa strips, as I get better results than by using wide sheet material. Start with the longest pieces that go from the firewall back to the cockpit sheeting, ending at former F-4. Start by gluing the lowest planks on either side and work up to the top. Do a few planks on one side, and then do a few on the other. Use aliphatic resin to glue the planking as it is much easier to sand than CA. You'll have to taper some planks at the front end to allow for the

Here, all the fuselage formers have been installed. Note the stiffeners installed across the back of some formers.

GEE BEE HISTORY

The first sport planes built by the Granville brothers were single-seat beauties called Sportsters. When business was bad in the Depression, the Granvilles thought that a two-place version of a Sportster would be a more sellable product. They basically enlarged their Sportster design by 20 percent to make a two-place aircraft. Thus was born the Senior Sportster Model-Y. The first single-seat Sportster was known as the Model-X.

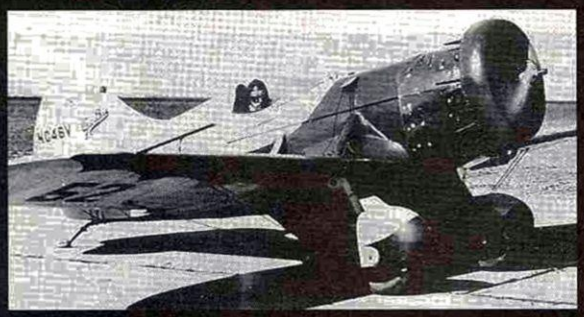
These aircraft were not originally built or designed for racing. They were high-performance sport aircraft built for wealthy sportsman pilots. Air racing, however, was so popular then that most pilots who owned an airplane would race at the numerous airshow events. Races were run on the basis of engine displacement, and the Gee Bee Sportster became known as *the* race plane because nothing in its engine class could keep up with it.



Tait's Gee Bee Model-Y in front of the grandstands at the 1931 Cleveland Air Races.

The Model-Y became an even better racer than its smaller predecessor. Model-Ys were such successful racers that the Granville Co. decided to build an all-out serious race plane to try to win some of the big money prizes at the National Air Races. This racer became the Model-Z Super Sportster. In 1932, two more race planes, the R-1 and R-2 Super Sportsters, were built.

The Model-Y, though not intended as a race plane, won more races and more money than any of the all-out racers that followed it. When the Model-Y was flown in races, its front cockpit was covered over, and the front windshield was removed. A little-known fact is that during the 1932 Omaha Air Races, Russell Boardman won the top racing prize and later took the Model-Y up again and won the National Aerobatic Championship. All of the Gee Bee Sportsters were excellent aerobatic mounts and were a big hit at airshows.



Above left: earlier Gee Bee Model-E with Bob Hall in cockpit. Colors are green and white. Above right: here's the Model-Y showing both cockpits.

FLIGHT PERFORMANCE

• Takeoff and landing

Don't let the name Gee Bee scare you off; this Model-Y is really a Peashooter in disguise. Remember, you don't have a steerable tailwheel, so to help swing the tail and tailskid around, you should release some of the up-elevator while you are taxiing. Once you're lined up for takeoff, advance the throttle slowly and work the rudder lightly to keep the model tracking straight. The model comes off the ground quickly, and you should keep the climb-out shallow until you gain some airspeed.

Coming in for landings is not at all demanding except that the model is a little draggy. Keep the nose slightly down and maintain a small amount of throttle until you're over the end of the runway. Once lined up for landing, pull the throttle back to idle and slowly feed in up-elevator to flare the model into a 3-point attitude. Just hold that attitude until the model touches down.

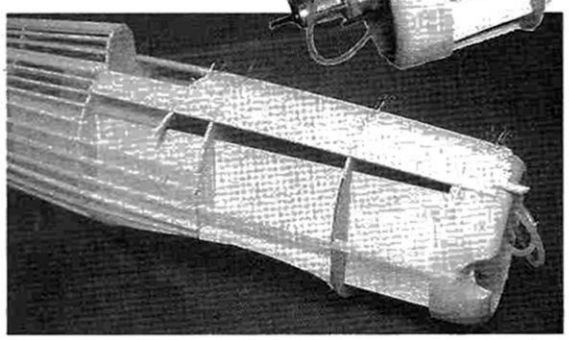
• General flight performance

As I've said before, the Gentle Gee Bee series of models were built to get people to fly Gee Bees. There are no hidden monsters waiting for you to make a mistake. The Model-Y has the same gentle flight characteristics as my earlier Gentle Gee Bee Long-Tail Racer. At the 1997 Rhinebeck Jamboree, Editor-in-Chief Larry Marshall flew my Model-Y, and we both had a great time.

• Aerobatics

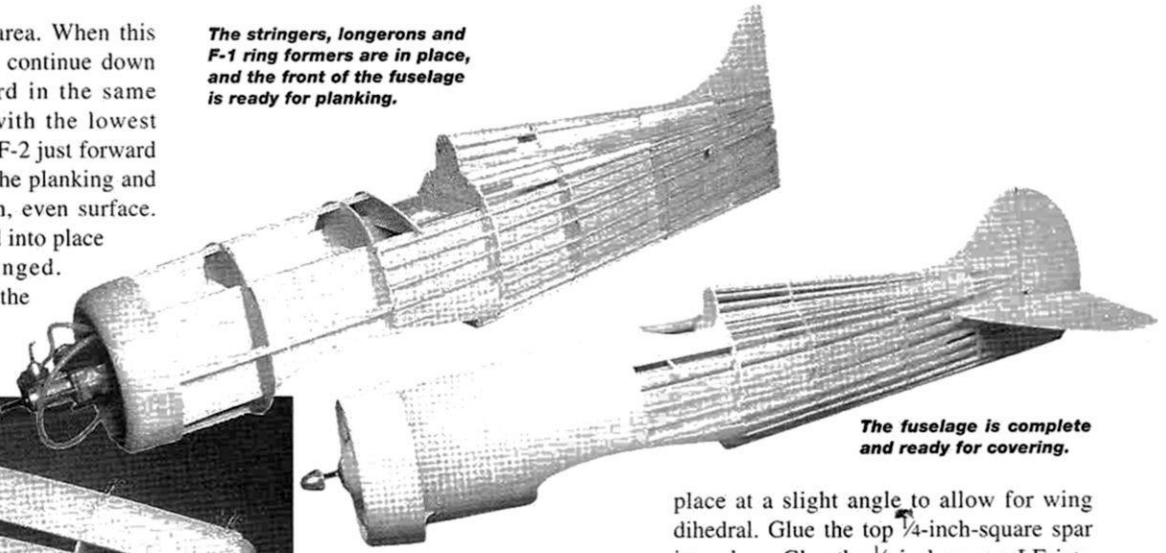
The Model-Y will do just about anything you'd like to do with a .40-size sport-scale model. The original is powered by an old K&B .40, and there's plenty of power for loops, rolls and even some short runs in knife-edge. The model does 4-point rolls nicely, and slowed down, the Model-Y remains friendly and predictable. Vertical performance is not unlimited, but that's a matter of engine power.

compound curve in that area. When this top planking is complete, continue down from former F-3 forward in the same manner, and finish up with the lowest planking between F-l and F-2 just forward of the wing saddle. Sand the planking and the stringers for a smooth, even surface. The stab can now be glued into place and the tail surfaces hinged. You might want to cover the stab before you glue it into place.



I've just started the top planking, shown here pinned to formers till the glue dries. Alternate from one side to the other when you apply the planking.

The stringers, longerons and F-1 ring formers are in place, and the front of the fuselage is ready for planking.

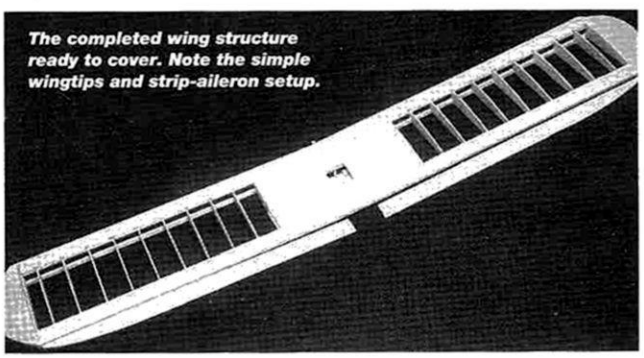


The fuselage is complete and ready for covering.

• **Wing.** This is very easy to build and goes together quickly. Cut out all the wing ribs from the material shown on the plans. Then make up the lower LE and TE sheeting and spar assemblies. Cut two lengths of 1/16x2-inch sheet balsa and two lengths of 1/4-inch-square balsa 25 3/8 inches long. Place the 1/4-inch-square spar on top of the sheet flush with one edge, and glue into place.

Repeat this with the other pieces to form the LE sheeting and spar assemblies. Cut two lengths of 1/16x1-inch balsa sheeting and two pieces of 1/4x3/8-inch balsa 27 inches long. Butt the 1/4x3/8-inch balsa against one edge of the sheet with the 1/4-inch side against the work area and glue them together. Now make the second assembly to form the TE sheeting assemblies. Place the LE and TE assemblies over your plan, and connect them with the root and tip-rib A. Glue these into position making sure that they're properly seated with the rear sheeting tight against the cut-out in the bottom of the rib. Glue the ribs only to the spar, not to the sheeting. Install the remaining A-ribs, making sure they all seat correctly. Glue the rear part of ribs B, C and D into place. Rib D should be glued into place at a slight angle to allow for wing dihedral. Glue the top 1/4-inch-square spar into place. Glue the 1/2-inch-square LE into place, then glue the front parts of ribs B, C and D into place. You can now glue the bottom of the ribs to the LE sheeting.

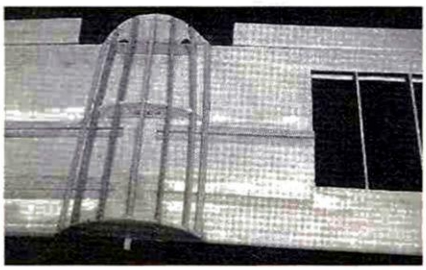
Build the opposite wing panel in the same way, then add the top LE and TE sheeting to both panels. Slide the dihedral brace into the slot formed between the fronts and backs of the inboard ribs on one panel. Join the two panels by sliding the other panel onto the dihedral brace. Trim the center ribs for a



The completed wing structure ready to cover. Note the simple wingtips and strip-aileron setup.

good, tight fit, and glue the dihedral brace into place. Block the wingtips up with blocks of equal size to keep the panels aligned while the glue dries.

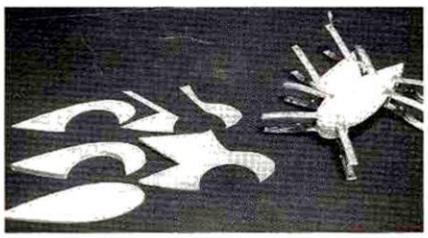
Install the landing-gear blocks, then install the ¼-inch-diameter dowel in the LE. Epoxy the dowel into place and add the ⅜-inch-square servo-mount blocks. When the glue has dried, add the top and bottom wing center-section sheeting. The wingtips are made of two layers of ⅛-inch balsa. Bevel the fronts of the four tip pieces so that when the pairs are glued together, they form a notch where they fit against the rear of the LE. Glue the tips into place and then trim the excess off the TE. Sand the wing to final shape, and round the LE to a blunt radius.



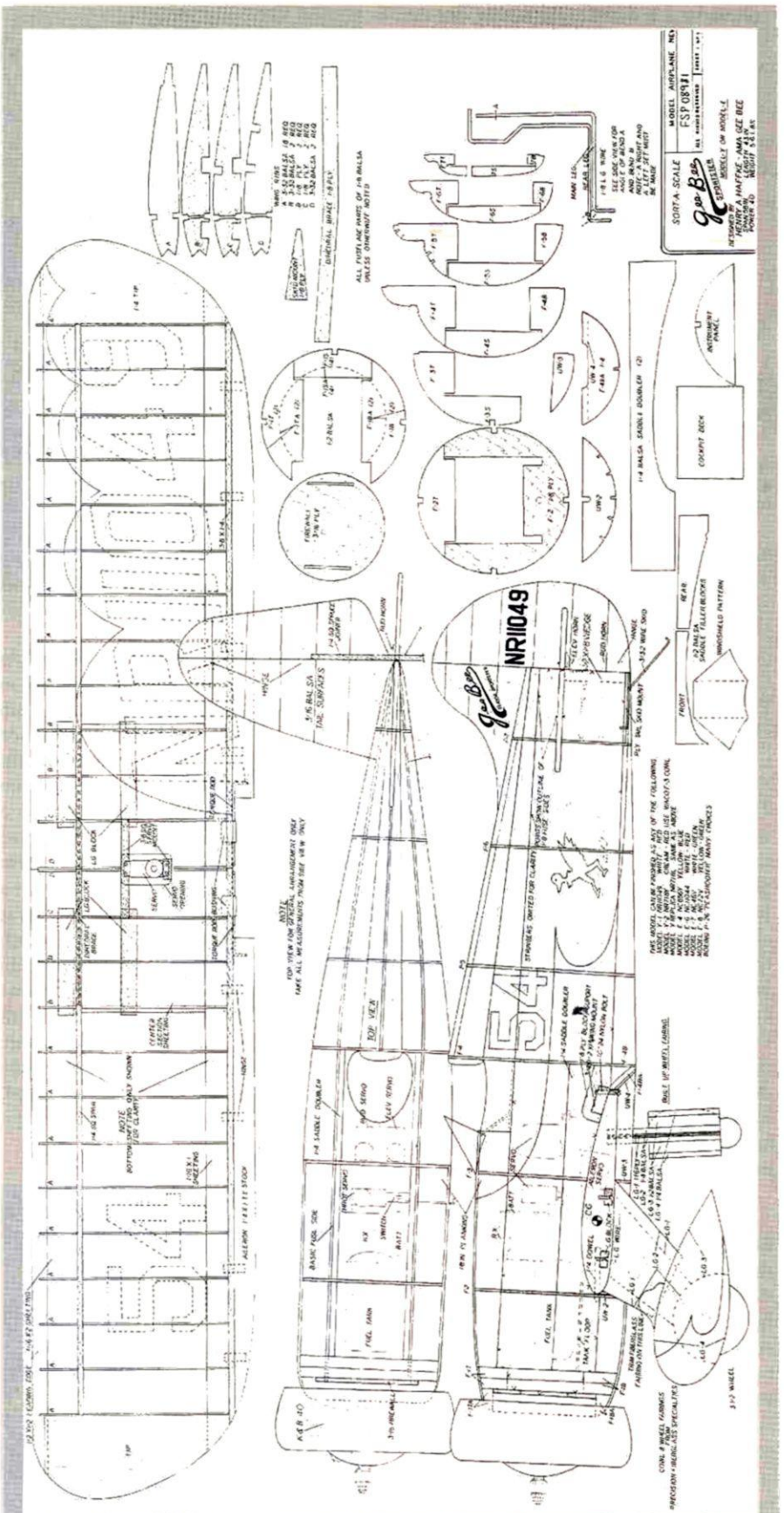
The under-wing center-section structure is glued into place while the wing is bolted to the fuselage. This way, it can be sanded to blend smoothly into the fuselage.

Fit the wing into the wing saddle and sand where necessary for a good fit. Align the wing with the fuselage by measuring from each tip to the tail post; the measurements should be the same for each side. Drill through the wing's TE and through the wing-mount blocks with a no. 25 drill bit. Enlarge the holes in the wing with a no. 7 drill bit after you have installed a ½x 4-inch strip of 1/16-inch ply centered over the holes. Tap the wing-mount blocks for a 10-24 bolt, and secure the wing with 1-inch-long nylon bolts. With the wing in place, install formers UW-2, UW-3 and UW-4 on the underside of it. Add the stringers and sand so everything blends smoothly into the fuselage. Make and install the strip ailerons, then mount the aileron servo and hook up the aileron linkage.

• **Landing gear.** Bend the landing-gear wire as shown on the plans, making sure

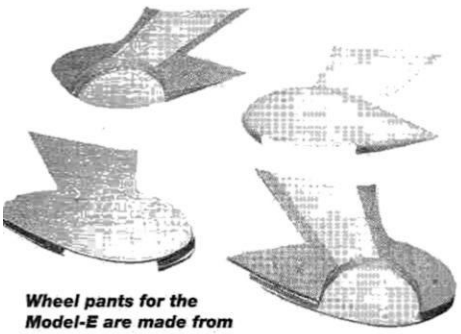


Shown here are the parts for one half of a wheel pant and one completed half that has been clamped together until the glue dries.



To order full-size plans (FSP08981), see page 127.

you make a left and right set. Mount the wires in the mount blocks and secure them with gear straps. Bind and solder the front and rear wires together to create the angle shown on the plans. The wheel pants are made by laminating the various wood parts as shown on the plan. Each wheel pant is

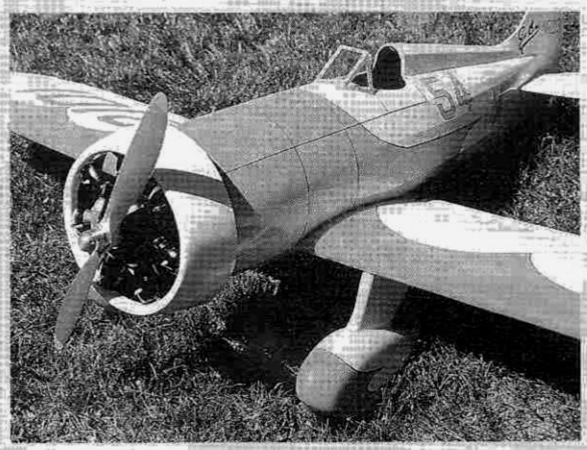


Wheel pants for the Model-E are made from laminated balsa and ply.

made in halves that are then sandwiched over the gear wires to form the finished assembly. The halves are pegged together with 1/16-inch dowels for alignment, then they're spot-glued together. An alternative to making the pants from wood is to use Ryan ST pants available from Precision Fiberglass Products* (see sidebar).

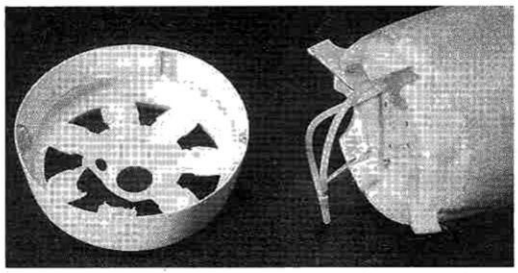
PANTS and COWL

The plans show built-up wheel pants, but if you prefer, you can use the Precision Fiberglass Products Ryan ST wheel pants by cutting away some of the upper portion of the fairing, as shown on the plans. These Ryan ST wheel pants are identical to the built-up balsa ones shown on the plans. The Model-Y cowl specifically made for this model can also be obtained from Precision Fiberglass Products. If you want your model to resemble one of the earlier Model-E Sportsters, a cowl for this version (which has a dummy Warner engine molded in) can be obtained from The Spirit of Yesteryear Model Airplanes, Stewart Pierce, 40 Holgate St., Barrie, Ontario, Canada L4N 2T7.



The model sports the Model-E cowl that has the dummy Warner engine molded into it.

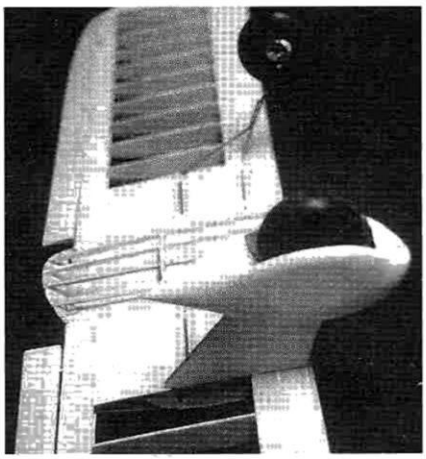
• **Engine cowl.** There are many ways to secure the fiberglass cowl. I made four tracks from eight pieces of triangle stock glued inside the cowl in pairs. Four 1/8-inch-ply blades glued to the firewall match up to the tracks, and screws secure the blades to the tracks to hold the cowl in place. This arrangement is strong and invisible from the outside.



Cowl mounting. Note ply blades glued to firewall and tracks inside cowl, which slide over blades.

COVERING AND FINISHING

Final-sand all the wood parts with fine sandpaper, and clean off any dust. Flaws in the structure will show through the covering, so attend to them now. My model is covered with the 21st Century fabric made by Coverite*. This is pre-painted and is very easy to apply. First, I applied a coat of Balsarite to the entire airframe, then I covered the model with white. I added the red trim by ironing red fabric over the white using paper patterns to form the wing and fuselage scallop trim. A 1/16-inch black Coverite pinstripe separates the red and white. The registration and racing numbers were cut from red fabric and ironed into place over the white, while the rudder numbers and "Filaloola" birds on the side of the fuselage were cut from Coverite red Graphic Trim. The Gee Bee logo on the fin was cut from black Graphic Trim. The cowl and wheel pants were painted with 21st Century paint, and the red trim on the pants was done with red Graphic Trim. Cut the windshield from clear plastic and glue it into place to complete the model. Re-install the engine, radio and control surfaces, and prepare the model for flight.

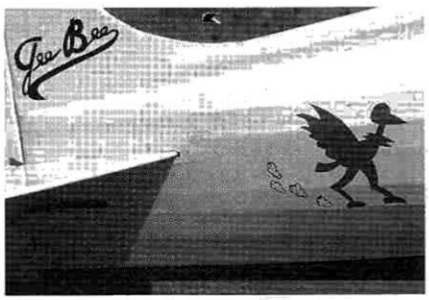


The landing gear has been mounted on the wing, and one wheel pant has been installed.

FIRST FLIGHT

It was quite a while before I flew the finished model for the first time. I broke my leg in April, and I did not get out to fly until mid-October.

Things went pretty much as I expected, as the Model-Y is basically the same design as the Gentle Gee Bee. It took off nicely, and after a couple of shaky trips around the field while I adjusted the trims, the model behaved very well. It rolls and loops nicely and flies inverted with just a touch of down-elevator. I did a couple of Cuban-8s followed by some low passes. Like my first Gentle Gee Bee, the

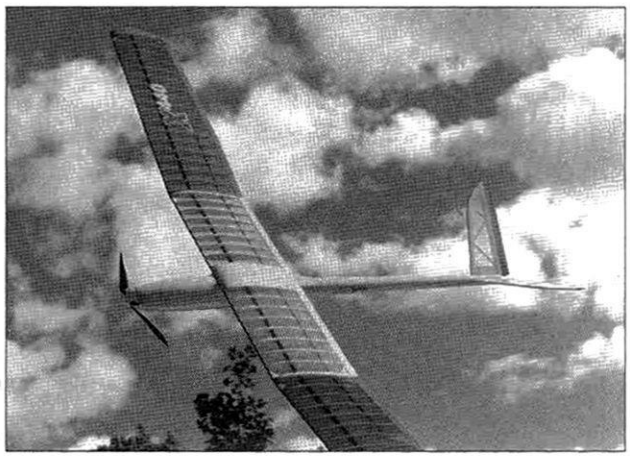


The little red "Filaloola bird" is cut from 21st Century fabric and ironed over the white fabric. The "Gee Bee" logo is hand-cut from Coverite's black Graphic Trim and stuck into place.

Model-Y is a real beauty in the sky. I am sure that many who have built the Long-Tail Gee Bee Racer will want to build this one as well. I know you will enjoy owning a Gee Bee Model-Y.

**Addresses are listed alphabetically in the Index of Manufacturers on page 142.*

SR X440



Well, it's been about a year since we introduced our X440 electric sailplane. And, boy it's been some year! To all of you who had to wait for an X440 we have to apologize. Our production just couldn't keep up with the demand no matter how hard we tried.

We know the wait was worth it because so many of you have written to tell us how much you liked your new X440. Mike McG. wrote,"The X440 you sent me has been a pure joy! While the climb out is no where as dramatic as my Class A/B sailplanes, its low wing loading and thermal capability more than make up the difference!" Mike bought the *Standard Power System* for his X440 so his climb rate was more gentile.

Jerry H. wrote, "The quality of the model is simply amazing. I just cannot get over how nice it is. The covering job is unbelievable. The instructions are also top notch."

Here's what Chris M. had to say, "Just wanted to say how pleased I was with the X440 that you sent to Winnipeg for me this summer. I put it together on my brother-in-law's dining room table on the Sunday afternoon after I got there and went out flying the next morning. Everything worked just as it should. What a treat.

My first flight was 35 minutes with the help of a couple of thermals.. It exceeded my expectations in every way!"

Just in case you're not familiar with the X440, it's a *Custom Built* electric sailplane. It will take you about 2 hours from the time you open the box until you head for the field.

Sure there are other Ready-To-Fly and ARF kits but for the most part they are lead sled plastic bags and they still take a bunch of hours to get flying. The X440 is made up of CNC computer cut balsa and carbon fiber parts and a fiberglass fuselage. The X440 only weighs 10 ounces and once you've installed the radio system and power system the total weight is about 22 ounces for a wing loading of only 7.5 *ounces per square foot*! It has a 64.5" wing span and a wing area of 440 square inches. The aspect ratio is 9.4:1 and the airfoil is the S3021.

Power for the X440 is either a simple geared Speed 400, AP29BB, or Astro 020 Brushless motor powered by 7 of our 500 Max Series cells. As you can see from the chart below, The *Standard Power System*, which uses a Speed 400 6V motor, will give you 5 climbs to altitude from a single charge. It doesn't get much better than that!

As I've said, this is a *Custom Built* kit. By that I mean that everything is pre-built and all you have to do is mount the motor with two screws, mount the servos, and hinge and connect the control surfaces. That's it! It's as if the world's best builder custom built the X440 for you. Frankly, you've never seen an aircraft which has been built and covered as well as the X440!

Because the parts are CNC machined, they are all identical. This not only means that the parts fit right but it also means that we can stock spare parts so that if the unthinkable should happen, we can get you back in the air in a hurry.

How does the X440 fly? As good as you could want with absolutely no bad habits. You can thermal or motor around to your heart's delight. Even with its outstanding performance, it's an easy airplane to fly and would be the ideal aircraft to use to introduce a newcomer to our Hobby. The price? Only $229.95 plus shipping but if you buy an X440 along with a *Power System* at the same time, we take $20 off of the price of the X440.

Here's an important point. To provide you with the utmost in performance and the fastest building time, we've designed complete radio and propulsion packages for the X440. We've thought out all of the details ahead of time so you won't have to waste time making all the decisions usually associated with building a new aircraft. Call us if you have any questions or to place an order. You can reach us at SR Batteries, Inc., Box 287, Bellport, New York 11713. Our phone is 516-286-0079 and our fax is 516-286-0901. Our Email address is 74167.751@compuserve.com .

If you'd like to be flying one of the world's finest electric aircraft, give us a call and we'll get one ready for you.

-ADVERTISEMENT-

Power System	Motor	# Cells	Total Wt.	Amps	Climbs/Charge	Wing Loading	Climb Rate	Flight Duration
Standard-7	Speed 400 6V	7	22oz.	9.5 A	5	7.2oz	650	36 min
Standard-8	Speed 400 6V	8	23	11.5	4	7.5	860	37.5 min
Performance-7	AP29BB	7	24	16.7	2.5	7.8	1150	33.2
Performance-8	AP29BB	8	24.5	20.00	2	8	1500	35.2

MODEL AIRPLANE NEWS

HOW TO

This Yak 3M designed and built by the author uses Robart® retracts and the type of landing-gear mounts described here.

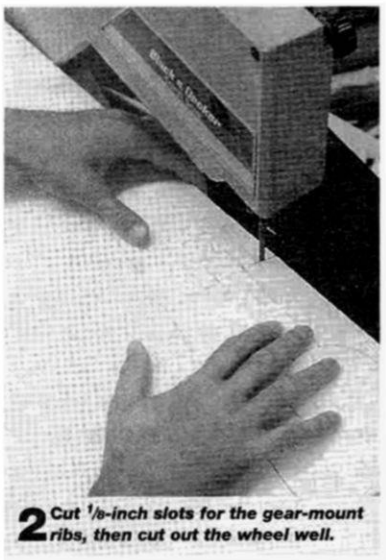
INSTALL LANDING GEAR in a Foam Wing

by LES MORROW

Sturdy, light and worry-free

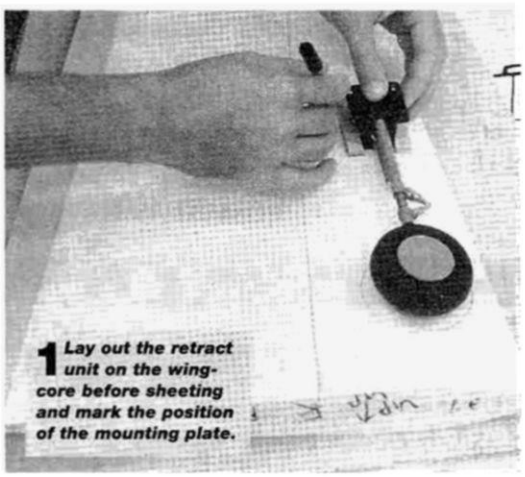
There are many ways to install landing gear in foam wings, and most work pretty well. If you aren't careful, though, overzealous bracing can add a lot of weight. It also seems that if something is easy to install, it just doesn't last very long.

Over the years, my son and I have built and flown warbird racers and have sometimes had trouble keeping gear mounts in the wing, especially with the finished weights of the aircraft we race. We tried all the methods we had read or heard about and have had limited success installing conventional landing gear in WW II single-engine fighters, but occasionally, a landing-gear mount would loosen or fail on a less-than-perfect landing. We tried various ways to securely mount the gear and still keep the weight reasonable, and we figured out a foolproof installation that's secure, light and compact, easy to install and will take all the abuse we hand it (short of an all-out crash). If you're interested in a landing-gear mount that will take lots of abuse, will still function correctly landing after landing and doesn't weigh as much as the engine, keep reading.

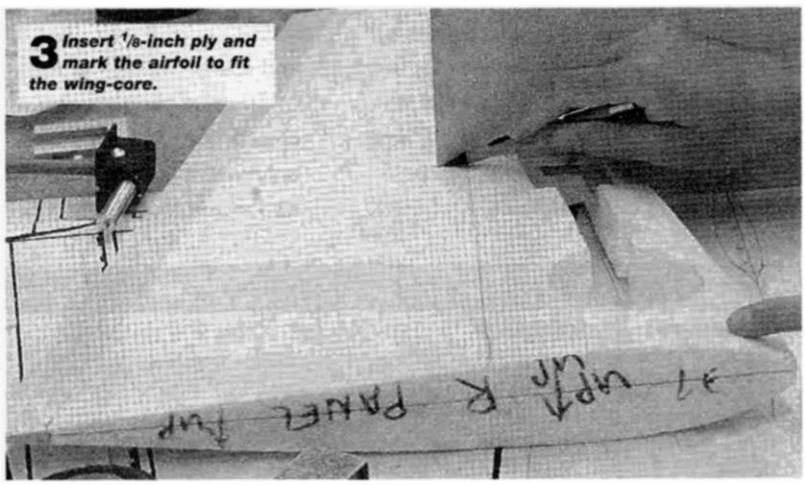


2 *Cut 1/8-inch slots for the gear-mount ribs, then cut out the wheel well.*

The first thing to do is make 1/4-inch-thick birch aircraft plywood landing-gear plates to fit your retracts. The plates need to be bigger than the gear assembly by about 3/4 to 1 inch all

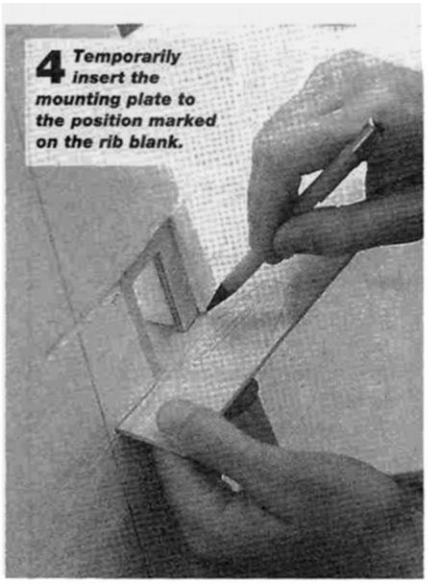


1 *Lay out the retract unit on the wing-core before sheeting and mark the position of the mounting plate.*



3 *Insert 1/8-inch ply and mark the airfoil to fit the wing-core.*

PHOTOS BY MORROW



4 *Temporarily insert the mounting plate to the position marked on the rib blank.*

around. After you make the plates, temporarily mount the gear to each plate so you can fit the plate into the foam wing-core (before sheeting) and align the rake, castor, retraction angle and position of the gear on the wing.

Mark the wing-core and carefully remove foam as needed to clear the wheel, strut, gear retract mechanism and mounting plate.

After the proper amount of foam has been removed and you are satisfied with the position, rake, castor, etc., take the core to your saw and cut two 1/8-inch-wide slots from the leading edge of the wing, chordwise, to approximately 1/2 inch past the hole you made for the mount. Make a cut on each end of the mount. I know; it looks as if the wing is going to fall apart, but trust me; it will all work out. Now take a sheet of 1/8-inch birch aircraft ply (three-ply minimum; five-ply is better) and slide it as far as you can into the slot you just cut. Next, draw around the core on the plywood (you're marking a landing-gear rib that will fit the wing profile exactly). After you've drawn around one plywood rib, slide the gear mount (minus the retract unit) in place tightly against the 1/8-inch ply, then draw a line on the plywood rib to mark where to cut a slot to insert the mount into the rib. Remove the new rib and gear mount, then repeat for the other end of the mount. When you've finished, do the same thing for the other wing.

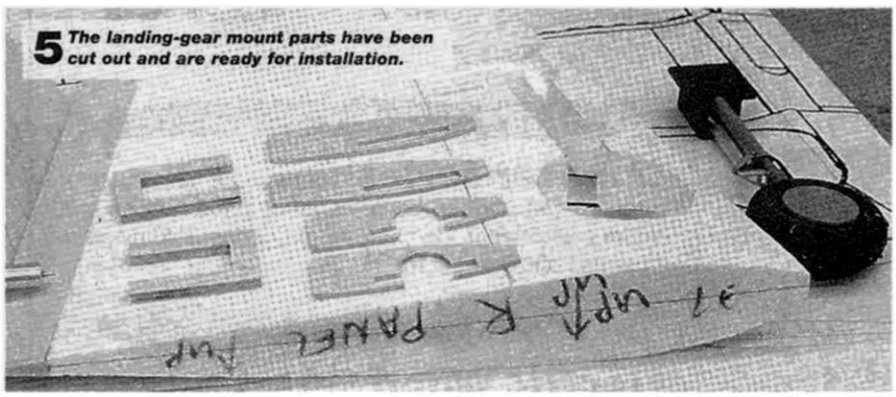
Cut out your plywood ribs, check the fit of all parts and epoxy the entire landing-gear mount assembly into the wing with 5-minute epoxy. Tape it into place and set it aside until it has dried.

When the glue has dried, check the position of the plywood ribs and sand them flush with the foam wing surface, if needed. You probably won't need much sanding, if any, assuming you did a good job of test-fitting the assembly on the bench before inserting it into the wing.

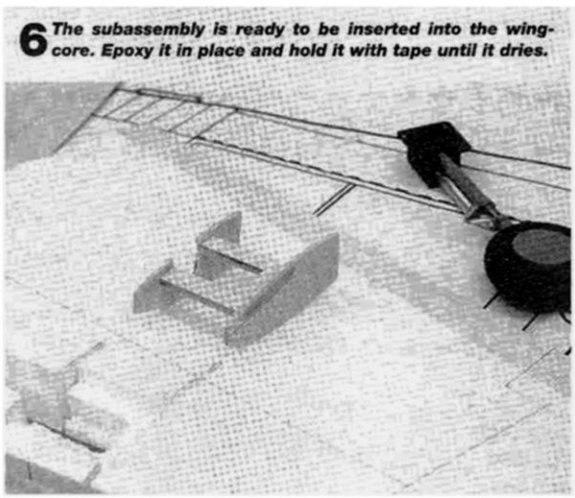
After you place the other controls, e.g., the pushrods and aileron/flap bellcranks, in the wing, prepare the wing for sheeting as per your favorite method. Sheet the bottom surface of the wing-core first so you can see where to make the wheel well and strut cutouts. If you're a purist, prepare a wheel-well liner of thin balsa, 1/64-inch ply, or something similar. Because we race our warbirds around pylons with other aircraft on the same course, and the potential for a midair is always present, we just sand the foam wheel well carefully, coat it with epoxy, then prime and paint. This method works well and is quick and light. Once you've finished the cutouts for the wheels, struts and retracts, finish sheeting the wing as usual, attach your leading and trailing edges, and sand to finish. After the wing is finished and the gear has been installed, build and paint gear doors and retract covers to match your documentation and color scheme and attach them using your favorite method.

This may sound somewhat complicated, but study the photos carefully. You will find this method is quicker than reading this article, and the mount assembly will be strong enough to outlast the airplane. You'll never go back to your old way of mounting retracts once you find how light, easy and strong this method is; we sure haven't!

**Addresses are listed alphabetically in the Index of Manufacturers on page 142.*

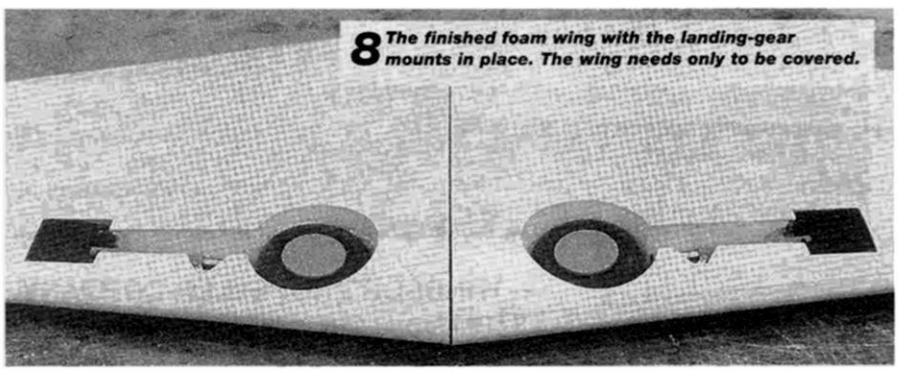


5 *The landing-gear mount parts have been cut out and are ready for installation.*



6 *The subassembly is ready to be inserted into the wing-core. Epoxy it in place and hold it with tape until it dries.*

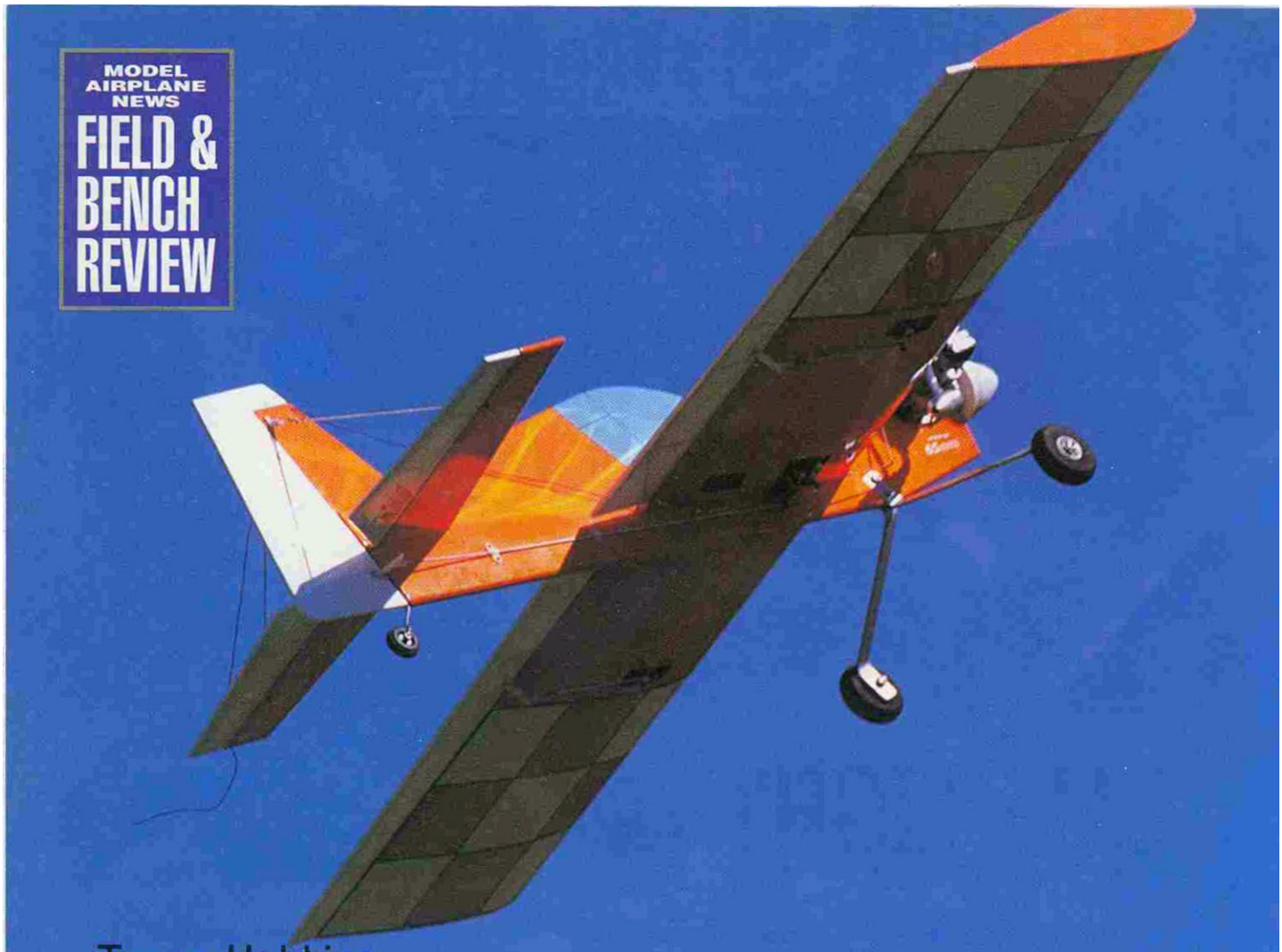
7 *When everything has dried, sheet and sand the wing-cores.*



8 *The finished foam wing with the landing-gear mounts in place. The wing needs only to be covered.*

MODEL AIRPLANE NEWS

FIELD & BENCH REVIEW



Tower Hobbies

Extra SPECIAL .40

BY ROGER POST SR.

AS AN AIRPLANE traditionalist, I always thought that an airplane should look like an airplane to fly like one. That opinion changed when I saw some of my club's more progressive flyers putting their fun-fly and profile models through some outrageous maneuvers—some only a few feet off the ground! As I ventured away from that exhibition, I thought to myself, "Someday I'll try that."

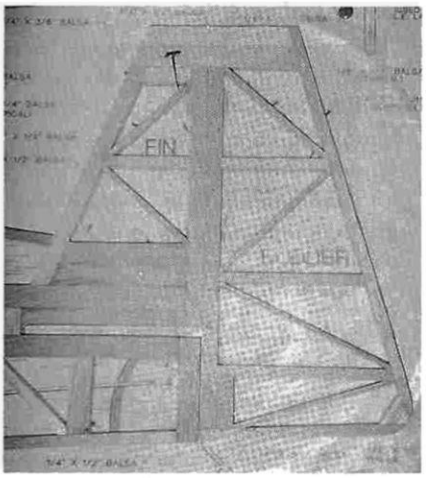
A profile with performance

Well, that someday came sooner than expected when I was asked to build the Tower Hobbies* Extra Special .40. The last time I built a profile model was back in the early 1960s; I believe it was the old control-line Ringmaster by Sterling. Construction techniques, however, have changed since those days. The instruction manual covers the building process well, so I'll just touch on the important points of the Extra's assembly and provide a few helpful hints.

FUSELAGE CONSTRUCTION

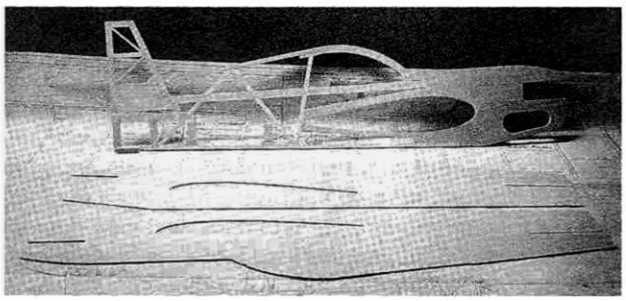
The most important thing about building a profile fuselage is to ensure that your building board is as straight as an arrow; otherwise, you'll need rudder trim to make your model fly straight.

Fuselage construction is easy when you follow the steps in the manual. It's important to note in step 3 that there are six areas on the plywood core (three on the left side, three on the right side) that need to be marked, so no glue will come in contact with those areas in steps 7 and 9. The vertical fin is built into the fuselage core, and the rudder is also constructed at this time.



The vertical fin is built into the fuselage core's framework, and the rudder is then built before the fuselage sides are sheeted.

When the framework has been completed, balsa sheeting is added to both sides. I glued together and shaped the side pieces for the fuselage before installing them onto the framework. The instructions say to glue one piece at a time onto the framework, but with no support piece for the length of the sheeting, there's a tendency for the unsupported edge to buckle slightly and create a lengthwise wave effect. If this happens, it's impossible to create a smooth, flat seam when you add the second piece.



I deviated slightly from the instruction manual's procedure; I made and shaped the fuselage sides before installing them onto the fuselage framework.

With the sides glued onto the framework, the final steps were completed and the entire fuselage was sanded.

FLYING SURFACES

The horizontal stabilizer and elevator are built from balsa sticks with the horizontal stab having a center platform piece that is ¼x3x4⅜ inches. This piece needs to be trimmed to size before any construction can take place. The only problem I encountered was that the elevator joiner piece, an ⅛-inch-diameter piece of wire that is pre-bent to shape, was 1$^{3}/_{32}$ inch too long. This problem was easily remedied by drilling the elevator joiner acceptance holes in the elevator halves a little farther out than shown on the plans (don't glue the halves to the joiner at this time). With the construction complete, the entire unit was sanded and then set aside.

The wing is built upside-down and, though its construction is not difficult, some important items should be mentioned.

- The two pieces of the 44-inch trailing edge (TE) are joined at the center by a diagonal splice.
- The two ¼x1⅛x24-inch leading edge (LE) sticks are pinned in place over the TE on the plans and form a temporary TE fixture. Cover this with wax paper and pin the TE you just made onto the top of the fixture. Note: my LE pieces were ¼x1¼x24 inches. To get the TE fixture the proper height, I had to shave ⅛ inch, lengthwise, off the 1¼-inch width of the two LE pieces.
- The main spars are spliced together to form the 44-inch length, but these splices occur toward the outer end of the spars—about three rib bays from the end. Note: make sure that these splices are on opposite sides of the wing when you install the second spar.
- In step 3, the instructions say, "Pin the bottom spar assembly into position ...." Since we are building the wing upside down, this should say top spar.
- When you glue the ribs into place, make sure the ¼-inch-square holes are facing up. There are four number 1 ribs and ten number 2 ribs; the number 1 ribs are used for the center section.
- In steps 4 and 5, "bottom spar" should be top spar; in step 6, "top spar" should be bottom spar.
- In step 7, plan out the LE sheeting splices so they fall opposite to the main spar splices; e.g. if the bottom spar (which at the moment faces you) has its splice on your left side, splice the bottom LE sheeting so its splice is on your right side. Splice the TE sheeting so its splice is opposite the diagonal splice in the TE stick. Keep this in mind when you flip the wing over and add the sheeting to the top of the wing.

From this point, finishing the wing construction is straightforward. Note that step 11 omits the step in which you glue the top TE sheeting into place.

The ailerons are built like the elevators and rudder. When their construction has been completed, cut hinge slots for all control surfaces and trial-fit them into place.

FINAL ASSEMBLY

The most important thing to note here is the alignment of the wing and horizontal stabilizer to each other and to the fuselage. I used Great Planes* 30-minute epoxy to glue the wing and stabilizer into place. When the epoxy dried, I filled in any gaps

SPECIFICATIONS

Model: Extra Special .40

Manufacturer: Tower Hobbies

Type: profile/fun-fly aerobatic aircraft

Wingspan: 44 in.

Wing area: 630 sq. in.

Airfoil: symmetrical

Weight: 4 lb., 7 oz.

Wing loading: 16.22 oz./sq. ft.

Overall length: 34.5 in.

Radio: 4-channel w/5 servos

Radio used: JR 783 w/four 531 servos and one 321 on throttle

Engine recommended: .35 to .50 2-stroke or .40 to .52 4-stroke

Engine used: O.S. FS-52S 4-stroke

Propeller used: Master Airscrew 11x7

List price: $59.95

Features: builds extra fast and extra easy; "Extra" look with profile fuselage and strong D-tube wing design; strong, ultra-light wood construction; integral engine mount and "between-ribs" servo rails for easy servo installation; basic hardware package that includes Duraluminum gear and wire pushrods; rolled, full-size plans.

Comments: I found the Extra extremely easy to build, and I would recommend it to the R/C pilot who is looking for an inexpensive way to get into fun-fly-type aircraft.

Hits

- Excellent die-cut on plywood and balsa parts.
- Strong construction.
- Plenty of room to install radio equipment.
- Easy to build.
- Wide landing-gear stance.

Misses

- Design of radio placement makes lateral balancing difficult.
- Edges of some balsa sheeting not true.

PHOTOS BY WALTER SIOAS & ROGER POST SR.

FLIGHT PERFORMANCE

• Takeoff and landing

The Extra Special .40 used about 30 feet of runway for its initial takeoff run. Throttle was gradually applied and directional control was maintained by using about 1/3 of the right rudder travel. At 2/3 throttle, the Extra lifted off the ground and climbed out smoothly. For the second takeoff, the throttle setting was a bit higher and the Extra took off and climbed out at a 70- to 75-degree angle without even a hint of stalling.

In the air, a click of left aileron trim and two clicks of up-elevator trim kept it in straight-and-level hands-off flight.

There are two ways to land the Extra Special: the first is the traditional approach with the downwind, base leg and final procedures. You can also land it from a vertical hover. For the traditional landing, put your control throws back on the low rates and land it like any other plane you fly. It can gather some speed on the approach, so make sure you control the speed with elevator pitch and flaps via the flaperon setup. It flares beautifully into a 3-point landing and rolls out as steadily as it took off.

The "hover-landing" altitude is controlled by the throttle and requires a sensitive touch on sticks. Once the tailwheel touches the ground, the nose will fall forward and the plane will zoom ahead a bit. To help control the forward motion of the completed touchdown, it's best to cut the throttle just before the main gear touchdown.

• Low-speed performance

The Extra Special .40 can be slowed to a crawl when the throttle is cut, some flaps are added and the elevator trim is adjusted for a slightly nose-high attitude. The power-off stall was interesting in that I had full up-elevator input, and the plane fell forward about 6 inches and then started to fly again. It repeated this procedure, leading to a progression of mini-stalls—sort of a porpoising effect—losing small amounts of altitude with each stall. The stall was extremely gentle and not once did a wing drop to a side.

• High-speed performance

I would describe this as "zippy." The Extra is fast when the power setting is high, and the control surfaces, at the recommended high rates, provide plenty of authority to make the model move instantaneously when a control input was given. If you're not used to very responsive control surface movements, I would recommend that for your first takeoff, the control surfaces be on the low-rate setting. The power-on stall was non-existent; the plane continued to climb until it was a dot in the sky.

• Aerobatics

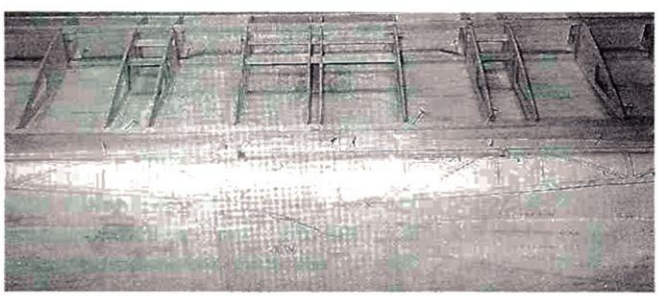
The aerobatic capabilities of this plane are unlimited. With the corrected lateral balance, the loops were precise with the wings remaining level throughout the maneuver. The roll rate was quick and axial both left and right, and it will spin very tightly when ailerons are added to the rudder and up-elevator input. Inverted flight required very little forward stick input, and all inverted maneuvers were as smooth as the right-side-up maneuvers.

Knife-edge flight showed the tendency toward roll and pitch coupling. This was easy to fix by slaving the corrective aileron and elevator inputs to the proper rudder input.

The 3D maneuvers (using the flap coupling to the elevator) are about as much fun as I've ever had flying a plane. The Extra almost looped inside itself! Inside and outside square loops were lots of fun.

with more epoxy to ensure solid bonds between the fuselage, wing and stabilizer.

Before you cover the Extra, it must be balanced laterally. (This will allow it to track better in loops and will help to keep the wing level in level flight—no aileron trim required to raise the wing's lower side.) Temporarily install the radio equipment, engine, fuel tank and landing gear; then pick up the plane by its propeller shaft and vertical fin several times and see which wing drops more often. Since the engine's cylinder head and muffler, three servos, battery pack, receiver, switch and fuel tank are on the right side of the plane (per the instructions), I had to add 2 ounces of weight to the left side to get the wing to remain level. A re-design in the placement of the receiver, battery pack and switch would help cut the need to add so much weight to one wingtip.



The wing is built upside-down on the plans, and all the ribs have 1/4-inch-square holes that must face up when the ribs are installed in place. The 1/4-inch-square holes accept the 1/4-inch-square hardwood servo-mounting rails.

COVERING AND FINISHING

Fill in any dings or holes and final-sand the entire airframe to a smooth finish. I used Coverite's* Balsarite film formula to seal the wood, MonoKote to cover the airframe and a white MonoKote trim sheet for details.

The manual has some helpful covering hints and a recommended covering sequence that I followed. The hints and sequence made the covering process quite easy and helped to avoid any bare wood spots.

Next, join the elevator halves and, when the epoxy has dried, attach all of the control surfaces. Install the gear, engine and fuel tank and then install the radio to the manufacturer's recommendations. Hook up the control surfaces to the servos and check to ensure they travel in the correct direction. Adjust the throws to the recommended high and low rates in the manual. These recommendations are a good starting place from which to venture as you become more proficient with the Extra's flying characteristics. I used a Horizon Hobby* JR 783 with four 531 servos and one 321 on throttle.

Since I used a 4-stroke O.S. FS-52S engine, the airplane turned out a bit nose-heavy. To correct this, I changed the wheels to a lighter pair, used a heavier than usual tailwheel, shifted the receiver and battery pack as far aft as possible and added functional flying wires to the tail surfaces. (The flying wires were an idea I had after seeing a similar type of model fold its horizontal tail when performing a high-G maneuver.) These changes helped balance the model more to my liking and added hardly any weight to the overall empty weight, which was 4 pounds, 7 ounces.

FINAL THOUGHTS

Well, that's about it; nothing terribly difficult in the construction process—just a few details to work out before a step is permanently completed. The manual provides many helpful hints about preflight inspection, takeoff procedures, flying and landing, and it's well worth reading before venturing out to the field.

I found this model extremely easy to build and would say that any modeler with moderate building experience could easily assemble the Extra. I also recommend that novice pilots seek experienced help to learn how to fly their Extra Special .40. It's a fine product and an inexpensive way to get into the wild maneuvers that go with fun-fly-type of aircraft. Good luck!

**Addresses are listed alphabetically in the Index of Manufacturers on page 142.*

R/C CYBERNEWS

by JIM RYAN

NEW PROGRAMS AT TOLEDO '98

Last time, we completed our series on using CAD to design a scale model, beginning with a paper or scanned 3-view and ending with a light and utilitarian airframe. Judging from the volume of email I received, this seems to be a topic of interest for many readers. The common experience seems to be that a modeler buys a CAD program—often at a trade show—takes it home and then says, "Now what?" Like the vast majority of you, I've never taken a formal course in CAD, but my job required that I pick up the basics on my own. Much like any other skill, mastering CAD is a function of familiarity and repetition. It's beyond the scope of this column to explore the arcane details of every CAD program targeted at the home user, many of which I have no more than a nodding acquaintance of. The goal has been to familiarize new users with the basic thought processes, cover the mechanics of some proven techniques and, most importantly, pique your interest in clicking that icon and making a start. The first time you complete a drawing is a rewarding moment, as many of you have now, hopefully, found out for yourselves. If not, what are you waiting for?

One of the modelers I've been corresponding with is *Model Airplane News'* very own Gerry Yarrish. Gerry is an experienced modeler with outstanding building skills, and for some time, he had owned a copy of Ashlar DrawingBoard*. He was interested in using CAD to create his own designs, but like most of us, didn't get over the hump of starting. Now, DrawingBoard and AutoCAD (which I use) are completely different programs, but our CAD series motivated him to make a start, and he certainly hit the ground running! Gerry is now producing designs at a staggering pace. Figure 1 shows one of his early 3-views, a Messerschmitt Bf-110. By now, he has probably drawn every aircraft in the Luftwaffe!

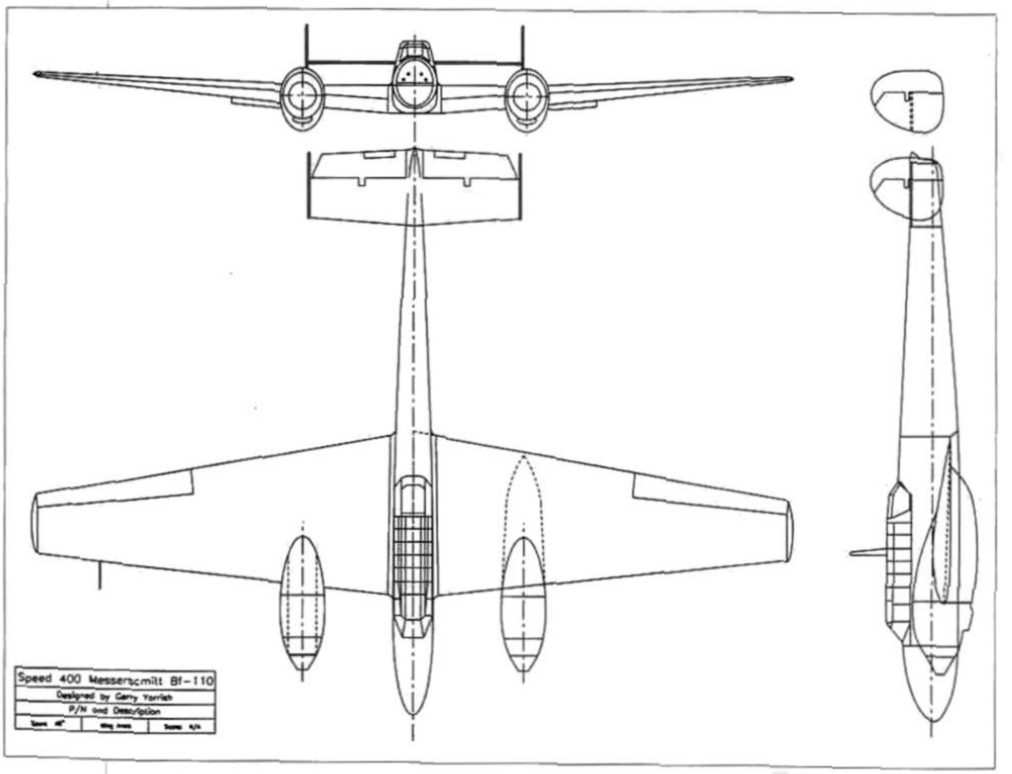


Figure 1. As an example of what can be accomplished in a short time, editor Gerry Yarrish drew this 3-view for a Messerschmitt Bf-110 twin-engine fighter using Ashlar DrawingBoard. The most important step in mastering a CAD program is getting started.

TOLEDO!

I just got home from the Toledo Weak Signals Expo, the greatest R/C show on the planet. If you've never been to the Toledo show, *go!* There's nothing else quite like it. In addition to seeing all the new products the manufacturers have dreamed up over the winter and picking up some terrific bargains, I get a chance to see friends whom I only talk to via email most of the year. Perhaps most of all, it has become an annual ritual that marks the end to the hardcore winter flying season and the beginning of the season of taking lawn chairs to the field and really having fun. Space here doesn't permit mentioning all the interesting products I saw in Toledo this year, but I do want to mention some computer-related products that stood out.

REALFLIGHT SIM

Flight simulator programs continue to make tremendous strides, and two simulators were demonstrated at this year's Toledo show (provided you could wait in the long line of eager test pilots!). The newest offering on the market is the Great Planes* RealFlight Simulator (www.realflight.com/index.html). To give you some idea of the realism of the graphics and sound of this program, a friend of mine confided that when he first saw it running, he thought it was just an R/C video. The quality of the graphics and sound is truly amazing.

All this comes at a price, however, and getting the most out of RealFlight's capabilities requires a recent-model Pentium computer with at least 16MB of RAM (32MB recommended) and CD-ROM drive. Most importantly, the high-res graphics mode requires a fast Microsoft 3D-compatible accelerated video card. The program still looks fine in the standard graphics (low res) mode, which will run on a 66MHz 486 machine with at least 12MB of RAM. The complete simulator, with transmitter box, is available for a street price of under $200, and the simulator without transmitter is available for under $130. It's compatible with a Dave Brown transmitter box and joysticks, but it cannot be used with an Ambrosia or NHP

The Great Planes RealFlight Simulator has redefined realism for R/C flight sims. On a fast PC with a good 3D video card, the graphics look like videotape, and the sound is also excellent. The RealFlight website includes sample screenshots demonstrating the outstanding graphics.

transmitter. One interesting option sold by Computer Designs* (www.rctrainer.com/) is an adapter that can be used with your existing transmitter. The price is $84.95, and to me, this is worth it, since I can use my own computer radio with the simulator.

I spent a good deal of time talking to Anne Marie Cross, product support supervisor for Great Planes. She not only gave me an excellent overview of the simulator's capabilities and system requirements, but also demonstrated an early version of the Volume 1 Add-On CD-ROM. This add-on, which should be available by the time you read this for a street price of under $30, adds six new terrains and 12 new aircraft to RealFlight's library. Three of the six terrains use Bryce 3D logic, meaning you can actually fly *inside* the terrain. The perspective of flying through a hilly Martian landscape is really something, and Great Planes will be releasing more add-on volumes with time.

DAVE BROWN FLIGHT SIM VERSION 5

The Dave Brown Products* Flight Simulator (www.dbproducts.com/rcfs.htm), long the standard bearer of R/C flight sims, was shown in its new Version 5. In addition to improved flight dynamics and sound effects (which require a Sound Blaster or equivalent sound card), the Dave Brown Sim includes The Hangar, a CD/ROM containing over 500 pre-set models based on actual kits. Furthermore, the "shape editor" option allows you to create and edit your own designs, including canards, vee-tails, etc. The flight realism has been improved over earlier versions of this popular sim, and seeing your own plane cruising across the monitor is a nice improvement over a generic sport model. The transmitter box now offers a nicer case and better gimbals.

At a street price of under $130 with transmitter box or under $90 without, the Dave Brown Sim is an affordable way for the newcomer to master the basic mechanics of radio control or for the longtime flyer to sharpen his skills or work on a particular maneuver. After all, it's cheaper than a crashed model!

The Dave Brown Sim will remain popular with the many users who have older computer systems. Although it runs best on a 486 or faster computer in a Windows 95 environment, it can still run on a 286 with DOS operating system. The Hangar aircraft library requires a 4X CD/ROM. I should mention that the Dave Brown Sim also works with the Computer Designs R/C interface mentioned earlier, so you have the option of flying using your favorite transmitter.

CAD AND WING DESIGN

ViaGrafix* (www.viagrafix.com) was showing ModelCAD 98, the latest version of this low-cost CAD program, along with their more advanced systems, DesignCAD 2D and 3D. They also offer a complete line of tutorials that can shorten the learning curve for users. I have to admit that I have trouble with some of the trim functions in ModelCAD, in part because I'm just not familiar enough with the program, but a short demonstration made it clear that ModelCAD 98 is a major improvement over earlier versions.

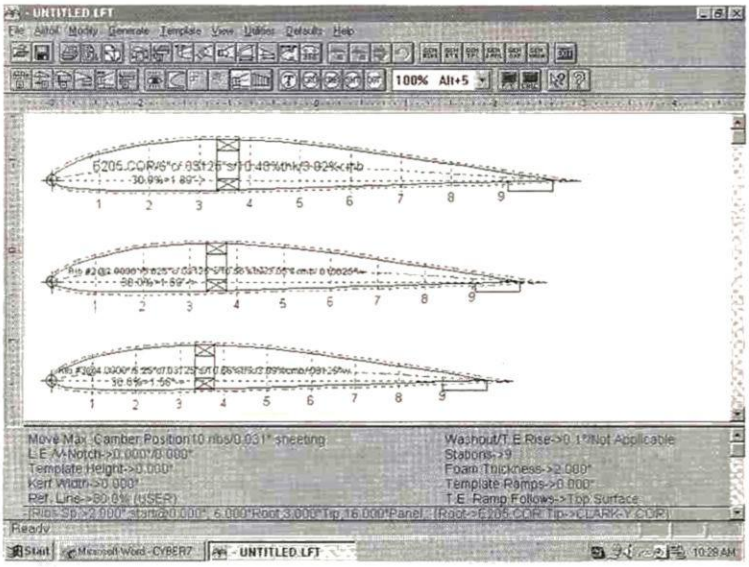
WingMaster is one of the growing crop of specialized airfoil- and wing-design programs. These applications

The Dave Brown R/C Flight Simulator is better than ever in its version 5 release and will still run well on older systems. Though best used on a 486 or faster computer in the Win95 environment, it will still run in DOS on a 286.

have expanded beyond their original purpose of serving as a sort of airfoil library to make it possible to design an entire wing structure. The wing ribs can be printed out, allowing for sheeting thickness, spar slots, leading edge stock, etc.

ModelCAD 98 is designed for the Windows 95 environment, and it takes advantage of Win95's capabilities. ViaGrafix almost always runs show specials, so you can pick up ModelCAD, along with the companion WingMaster wing-design program, at significant discounts.

One program that really caught my eye was CompuFoil98, the latest version of CompuFoil Pro* (www.ourworld.compuserve.com:80/homepages/compufoil/). Eric Sanders has done a remarkable job with this outstanding program. Judging from the free demo version, the learning curve is incredibly short; in less than 15 minutes, I had designed a built-up wing, using one foil section for the root and another for the tip (CompuFoil plots the transition in between). By clicking through the easy-to-follow icons, I set the panel span, rib spacing, chord lengths and sweep angle to define the planform. Then I set the washout, skin thickness and spar location. You have your choice of leading-edge materials, including sheet, V-notch and dowel stock. In seconds, you can add either trailing-edge tabs for building on a board or jig holes for building on a rod-type wing jig. The program will also handle elliptical wing sections, so even complex designs like Spitfires and Tempests are no problem.



The latest version of CompuFoil Pro makes designing wings, whether built-up or foam, easier than ever. This tapered wing, which transitions from one foil section at the root to another at the tip and includes dowel leading-edge stock and trailing-edge alignment tabs, was generated in less than 15 minutes.

When the design is complete, you have the option of exporting the ribs to a DXF file for inclusion in your CAD-generated plans. If you're designing a giant-scale model and have a regular printer, CompuFoil98 supports automatic tiling. There just doesn't seem to be anything they've missed. I'm a long-time fan of foam wings, but with CompuFoil making it this easy, I may have to do some built-up wings just for fun!

Those who like to build with foam will also like CompuFoil. It includes features specifically tailored to Tekoa's* FeatherCut foam-wing-cutting system and will print out a set of cutting templates ready for use, including lead-in ramps for the wire. It even has a calculator utility that determines the correct taper settings for the FeatherCut machine. This is truly outstanding attention to detail.

Because of the wide range of options, CompuFoil is sold on a "cafeteria" basis; you pick and choose the options you want, and the price varies accordingly. The basic program is $35, ranging up to $115 for the deluxe version. Discounts are also available, so contact them for details.

That about wraps it up for this installment. Next time, we'll talk about using the Internet as a resource for researching a scale project. Until then, flying season is here, so don't spend all your time staring at a monitor!

** Addresses are listed alphabetically in the Index of Manufacturers on page 142.*

by GREG GIMLICK

DO-IT-YOURSELF MOTOR MOUNTS

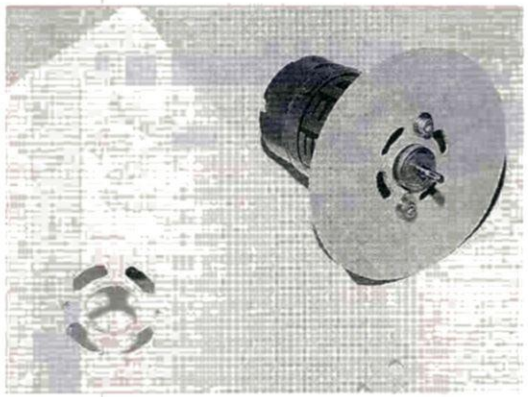
We're deep into the flying season, so you're probably already enjoying your electric plane and building a couple more to satisfy that craving. In my last column, we looked at some available commercial mounts and how they worked, but this month, I want to address a situation where you might want to make your own mount because of special needs or because you need a mount and there isn't one at the local hobby shop.

DIRECT-DRIVE MOTOR MOUNTS

If you're mounting a direct-drive motor, it's usually an easy matter of bolting it directly to the firewall using the threaded holes on the front of the motor can. I've done this a million times, but with a few extra minutes and some work with a Dremel tool, you can make the mount much better and not abuse the motor so badly. In the accompanying photo, I have a Graupner* Speed 600 mounted to a round firewall that's ready to be glued into the plane. Rather than just drilling the center hole and bolt holes, I also routed out some holes over the motor's endbell cooling holes. This allows air to get into the motor and helps it live a long and fruitful life (assuming no sudden impact with a cumulo-granite cloud).

To do this, I took a piece of paper and cut the center hole with a sharpened brass tube of the appropriate size, placed it on the motor and made a pencil rubbing of the end of the motor. We end up with clearly marked outlines of all the holes in the motor. I then cut the holes out with a knife and placed the paper over the firewall (be sure to center the hole on the firewall). When it's oriented the way you want (will the motor terminals inside the fuselage clear the bulkheads, etc., when the wires are soldered into place?), trace the holes onto the firewall and begin cutting them out. I used a 3/32-inch carbide grinding bit, and it took only a few minutes to have everything ready for the motor. In no time at all, you can have a custom-made mount in any shape you need.

If all of that seems like too much effort, or you just want to have some mounts on hand for the next time you need one, Tim McDonough* makes and sells some extremely nice laser-cut plywood mounts that fit Graupner motors, and he even includes the appropriate metric-size bolts. He has Speed 500/600, 400 and 300 round and square mounts; a package of three costs $5, including shipping, direct from Tim. All are available from New Creations R/C* as well. Tim also has new laser-cut control horns for Speed 300, 400 and 1/2A planes.



A homemade mount for a Speed 600 mounted on a round firewall, and the template I used to create it.

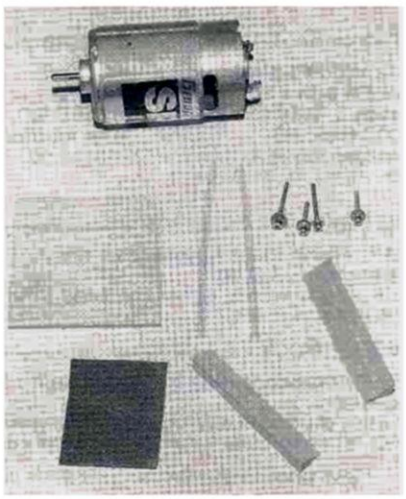
GEARED MOTOR MOUNTS

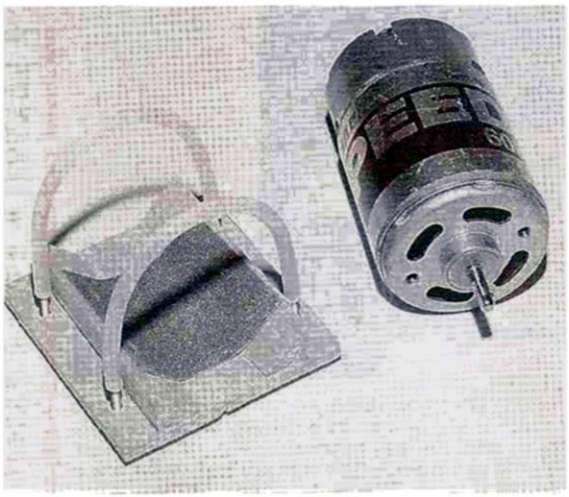
Most of our mounting woes seem to come from trying to mount geared motors because we can't use the holes in the motor now that a gearbox is attached. Keith Shaw gets the credit for designing a mount for use with any of the AstroFlight* motors with the external brush housing (probably the most widely used motors in the U.S.). Keith wrote a motor-mount "how-to" for the March '95 *Model Airplane News*; I'll condense the process here and hope it's clear enough to follow.

The main material used is 1/64-inch plywood. In step A (see accompanying photo), I've laid out and cut a piece of plywood that's the same length as the motor body from end to end. Don't worry about the brush housing yet; we'll fix that soon. I usually do a minimum of two or three plywood layers, depending on the motor I'm mounting, but in the photo, I've mounted an older 020 and for illustration, did just one layer.

This Keith Shaw mount for geared motors is made of laminated plywood.

The next step is to wrap some wax paper or plastic around the motor so you won't glue it to the plywood. Once that has been done, simply wrap the plywood around the motor until its ends overlap. Put a couple of drops of Zap* on the layer you're about to overlap and continue to roll the ply around the motor. When that's dry, do the next layer in the same way, and a third, if you think you need it. Just roll the plywood around the motor ahead of the brush housing, and be sure to keep the portion that extends beyond the motor the same diameter as the rest.





Don't have a lot of time? This mount can be made in 10 minutes using only the parts on the left!

In step B, I've marked the location of the brushes on each side, so I know where to grind slots for them. I use a Dremel tool with a little sanding drum, and it's almost a perfect fit, but if your drum will make the slot bigger than the brush, use something else because you want the notch to fit so the motor doesn't have any play once in place.

Step C shows the motor in place, having been slid in from the rear so the brushes are in their slots. A bit of trial and error is needed to get the notches cut to the right depth so the motor is even with the front of the plywood tube.

The last step, D, shows the tube glued into an appropriate size hole in the firewall. I use a hole saw for this, and if the hole is too big, I use another wrap of plywood to fill it out for a snug fit. When the motor is in place, you can use it as a direct drive, or simply bolt your gearbox to the front of it. The brushes prevent the motor from turning or going forward in the mount—simple, easy and effective. (You did take the wax paper off, didn't you?) I'm sure some of you are wondering about the heat of the motor wrapped in plywood, but in my experience it doesn't make a bit of difference, and Keith flies with some motors that have been mounted this way for over 10 years, so in my mind, it's a non-problem.

TEN-MINUTE MOTOR MOUNT

The two photos above show another easy way to make a mount that I'll credit to Bob Kopski, since he's the first one I saw use it. It has a plywood base, two pieces of triangle stock, two pieces of inner Nyrod, a piece of sandpaper and four 2-56 bolts with washers. Lay the motor on the base, slide the triangle stock into place to cradle the motor, and glue the stock in place (if you're using an AstroFlight motor, you will need to notch the base for the brush housing).

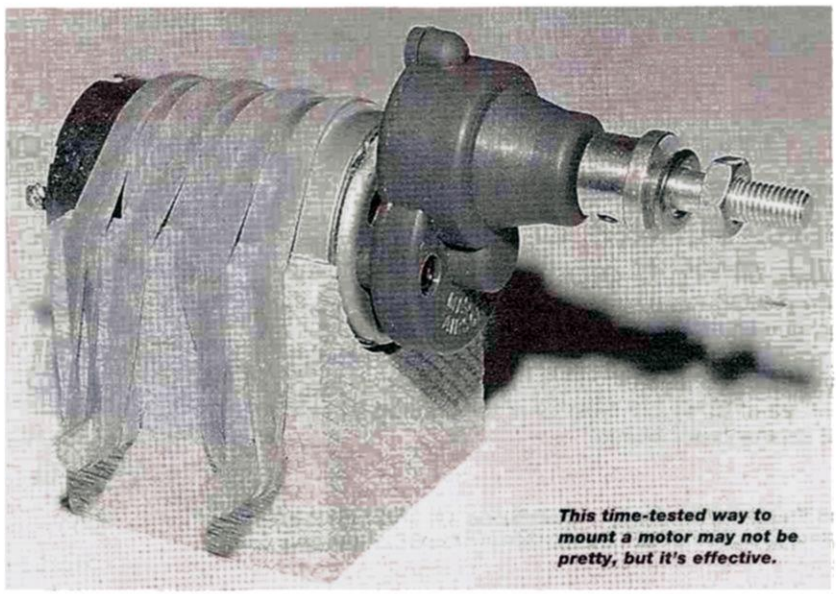
Next, glue the sandpaper into the cradle to prevent the motor from spinning once it has been clamped down. Lay the motor in the cradle and wrap a piece of inner Nyrod around it, pulling the Nyrod tightly down around the motor and marking it an $\frac{1}{8}$ inch or so above the base on each side. Cut both pieces to length and while holding them around the motor, mark the base where you want to drill the holes for the bolts. Once the holes have been drilled and the motor is laid back in the cradle, just wrap the Nyrod pieces around the motor and tighten them down with the bolts from the bottom to clamp everything in place.

This assembly can be mounted on the sides of a fuselage and reinforced with triangle stock, or it can be bolted to a pair of beams. If you use beams to mount it, be sure to check their location so they don't interfere with the Nyrod clamping bolts in the base. If you still have a problem with the motor's rotating under torque, try a bit of thin, double-sided tape in the cradle. I used this once, and it eliminated the problem completely, but it is a pain to get off if you decide to change motors.

This mount takes about 10 minutes to make and can be used with direct-drive and geared applications. It's also a great mount to use if you want to quickly change motors for testing or experimentation.

UGLY BUT EFFECTIVE

Last, but not least, is a mounting technique that's pure ugly, but very effective and often overlooked. Andy Clancy used a similar method in his early Lazy Bee design, and it's often



This time-tested way to mount a motor may not be pretty, but it's effective.

used for some of the old-timer designs that have been electrified. It consists of a block of balsa in the nose that has been cut to cradle the motor. I usually drill a big block on the drill press and then run it through the band saw to get the cradle block. Drill a couple of holes below the bottom of the cradle to fit whatever size dowel you need (I usually use a ¼-inch dowel for anything bigger than a Speed 400).

After the cradle and dowels have been glued into place, your motor is held in place by a number of wraps of rubber bands. Be sure to use enough rubber bands to hold the motor securely, and remember that they will get hot; this will make them deteriorate more quickly, so they must be inspected regularly. My Bee sported this mount for a long time, and I never had a problem with it. Many of the old-timers' noses taper below the motor, so before you glue the dowels into place, it's best to remove them and glue the block into place for shaping. When the final shape is achieved, you can put the dowels back through the holes and affix them permanently, or wait till you've covered the model.

So you see, mounting electric motors is like flying electric airplanes—just a bit different from what you may be used to. If you're used to heavier mounting techniques learned from years of glow flying, it may seem as if our mounts are a bit flimsy, but keep in mind that we don't have to fight vibration and fuel, so our main interest is preventing the motor from spinning due to torque. Of course, we want to prevent the motor from flying out of the plane, too! Regular maintenance is a part of flying electrics, so be sure to check those motor mounts regularly and look for cracks, worn rubber bands and other obvious signs of deterioration and remedy them early so the plane will last for years.

Remember to send photos of your airplanes and descriptions of your setups so we can share them with everyone else. Imitating a successful setup or configuration can help get you into the air quickly and successfully. I can be contacted through the magazine or directly at 1016 Camberley Dr., Apex, NC 27502-8107, or via email at greggimlick@mindspring.com.

**Addresses are listed alphabetically in the Index of Manufacturers on page 142.* ✦

Effective PROGRAMMING

by DON EDBERG

SAILPLANE RADIOS

This time, I'm going to talk about *modern* sailplanes and describe those features that can *only* be found on sailplane computer radios—and why you might need them. In case you're wondering, my last column was in the June '98 issue and covered helicopter functions.

WHY DO SAILPLANES NEED SPECIAL RADIOS?

If you haven't seen a sailplane lately, you might be wondering why they need special radios. After all, they fly slowly and only need two or three channels. That's hardly a challenge for even a regular radio, right? Well ... no; it isn't so anymore! Modern sailplanes, molded of high-tech composites such as carbon fiber and Kevlar, routinely fly at over 150mph (one holds the absolute R/C speed record; they're faster than powered models!) and have flown more than 100 miles cross-country. They aren't as simple as they used to be. To understand where glider radios are today, you need to hear a bit about glider evolution.

At first, sailplanes used only rudder and elevator (even today, many beginners' sailplanes still use only rudder and elevator). To make spot landings easier, modelers started adding spoilers to kill the lift on the wings. Some folks were concerned that we were cutting slots for spoilers and putting bumps in the most critical portion of the wing, where the wing needed to be strong and where the airfoil shape was critical. To compensate for the lost lift caused by spoilers, modelers added flaps. Whether you use spoilers with or without flaps, you usually have to compensate for trim changes by holding up-elevator as well.

Soon, with gliders flying speed and distance events in international competitions, maneuverability became important, and ailerons were added. Some bright pilots figured out that if the flaps could be used together with the ailerons, the "turning power" of the model could be improved; if used in opposition, landings could be made steeper and the spoilers could be eliminated, making the wing "cleaner" with less drag. To keep track of all these interactions (and others that you'll read about below), the need for a computer radio for competition sailplanes became very apparent. A good sailplane radio will contain a set of sailplane-specific programming functions to handle everything shown in Figure 1.

That being said, I want to emphasize the following: *sailplane beginners certainly don't need a computer radio*. In fact, you can get by with just a 2- or 3-channel system, which is going to cost less than half as much as a computer radio (just don't buy one of the really cheap 2-channel, 2-stick units!). If you think you're going to be seriously involved in sailplanes, however, you should strongly consider getting a computer radio. You'll grow into it as you become more proficient, and you'll be glad to have the extra capabilities when you need them. Later, I'll give some specific information on which manufacturers supply sailplane radios.

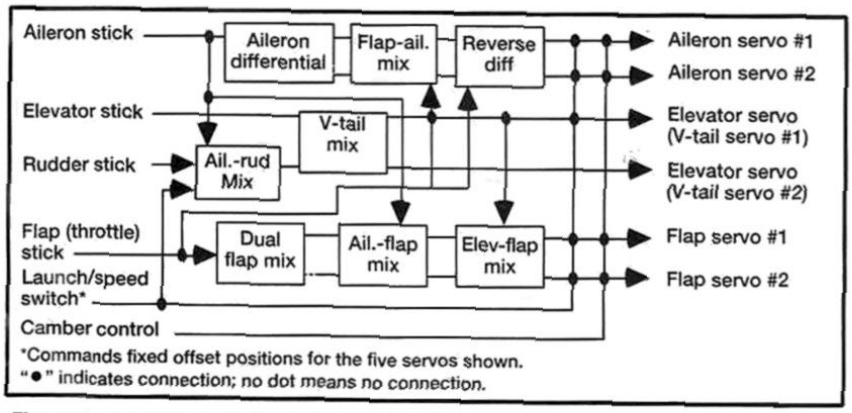


Figure 1. A sailplane radio contains all of the necessary functions to fly a six-servo competition sailplane. Spoilers and retract gear may be driven by auxiliary channels.

SAILPLANE FUNCTION DESCRIPTION

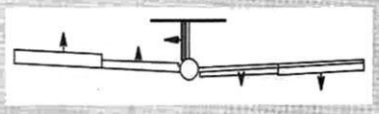
Let's take a look at the typical high-performance sailplane as shown in Figure 2. Seven servos are used: right and left ailerons, right and left flaps, elevator, rudder and spoilers. If the model happens to have a vee-tail, all the functions are the same except for the response of the two tail controls, which both move for elevator and rudder commands. Scale ships may have spoilers, which operate for glide-path control in conjunction with the flaps and ailerons. (Calling the wing controls "flaps" and "ailerons" is really misleading, since all four wing controls work with one another both as flaps and as ailerons. Even so, we'll still describe the outer controls as ailerons and the inner ones as flaps.)

Aileron—>flap mixing is used to get the wing's inner controls ("flaps") to work with the outer ones ("ailerons"). This makes the sailplane roll faster and reduces drag as well. You can select the amount of mixing, from 0 to 100 percent. About 50 percent or less is recommended.

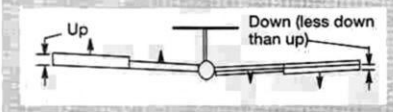
Aileron differential is another function intended to improve the sailplane's efficiency. You set up the function so the up-moving aileron moves up more than the down-moving aileron moves down, often in a ratio of 2:1 or higher (down motion is 50 percent—or less—of up motion). If ailerons are coupled into flaps, the flaps also obey this relationship; this reduces drag and helps to make coordinated turns, where the fuselage is aligned with the relative wind.

Aileron—>rudder mixing is used along with differential to make the sailplane fly coordinated turns, for highest efficiency. Quite often, the amount of mixing can be set to vary depending on whether you are launching, cruising, or landing. It doesn't take much, perhaps 15 to 25 percent mixing value.

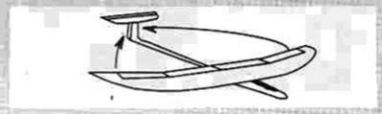
SPECIAL FUNCTIONS COMMONLY FOUND IN SAILPLANES



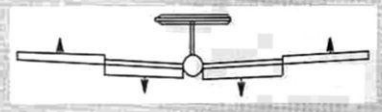
Aileron—>flap mixing
- Two aileron, two flap servos required.
- Servos work opposite for roll (aileron) function, together for flap function.
- Gives higher maneuverability.



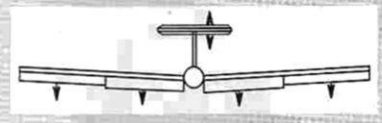
Aileron differential function
- Two aileron servos required.
- The down-moving aileron moves down less than the up-moving aileron moves up.
- Different up and down travel helps coordinate turns and reduces "adverse yaw" tendency, making turns more efficient (less drag).
- Reverse differential (more down than up) used for better response with airbrake.



Aileron—>rudder mixing
- Uses existing aileron and rudder servos.
- Reduces "adverse yaw" tendency and coordinates turns.
- When aileron commanded, rudder moves at same time.
- Allows coordinated turns, scale-like flight.



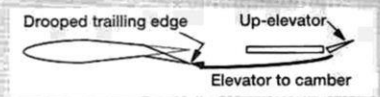
Airbrake (butterfly/crow) function
- Two aileron and one or two flap servos required.
- Aileron servos go up, flap servos go down.
- Controlled by airbrake (throttle) stick.
- Allows steeper yet slower landing approaches; precision landings.
- Use up-ailerons only if no flaps.
- Optional elevator delay stops trim changes.



Launch function
- Uses two aileron, one or two flap servos.
- Entire trailing edge droops for higher launches.
- Includes elevator preset to maintain trim.
- Switch-activated.

Speed or cruise function
- Uses two aileron, one or two flap servos.
- Entire trailing edge raised slightly for low drag at higher cruise speeds.
- Includes elevator preset to maintain trim.
- Switch-activated.

Camber function (proportional)
- Uses two aileron, one or two flap servos.
- Entire trailing edge rises or droops proportionally.
- Controlled by side lever.
- Can improve low- or high-speed flight.



Elevator—>camber function
- Dual flaperon servos or single flap servo.
- When elevator pulled, entire wing trailing edge droops at same time.
- Allows tighter pylon turns, smoother thermalling.

Glide-path control is referred to by various names (crow, butterfly, spoilerons) but they mean the same thing: a way to move the ailerons and flaps in opposition to each other so that there is both more lift (reducing the sailplane's speed) and more drag (making its glide angle steeper). These motions, along with elevator compensation, allow you to make very steep approaches and precision landings. The newest radios also provide an elevator delay function, which allows the flaps to "catch up" with the elevator to prevent trim changes. Glide-path control can also activate increased rudder coupling for smoother landings.

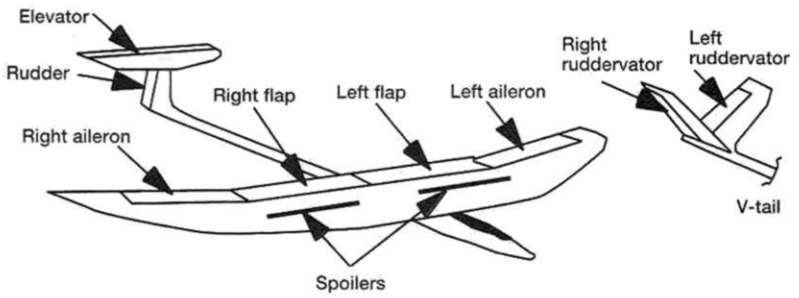


Figure 2. A typical high-performance sailplane. Four servos (often embedded in the wings) control the left aileron, left flap, right flap and right aileron, and two servos are in the fuselage for rudder and elevator (or vee-tail surfaces). Spoilers are also shown, controlled by a seventh servo. (Retractable gear is not shown.)

Reverse differential is used when you have the ailerons raised for glide-path control. This function commands the ailerons to move more down than up, so there's no loss of control authority when the ailerons are raised.

Flap—>aileron mixing makes the entire trailing edge of the wing act together, allowing full-span camber control. Camber control (Figure 3) is used to change the shape of the model's airfoil, which makes it have less drag in different flight regimes. The best sailplane radios (in this author's opinion) have a side lever conveniently located near the fingertips when you hold the transmitter. Others use an inconvenient knob on the front of the transmitter case (these can be programmed to put the camber control on the airbrake stick).

Elevator—>camber mixing is used to make very sharp and rapid pylon turns and can be set to only occur after the up-elevator passes a certain threshold; this is called "snap flaps."

Launch and **speed** presets are functions that command the wing's servos (and often the tail as well) to have a different neutral position, which is offset from the normal neutrals. The offsets are selected to provide better flight performance. For launch, the wing servos are all drooped to improve the sailplane's lifting capability while on tow. The speed mode reflexes (moves up) the trailing edge for less drag at higher speeds. Both modes provide elevator offsets so your model is in trim. The launch and speed modes are commanded by a switch. Futaba* calls the launch mode "START."

In addition to all these functions, advanced computer radios have what's called "flight modes." Flight modes typically combine sets of servo offsets, control throws and programmable mixers. Here's what we mean by flight modes:

- **Launch mode**. Here, the ailerons, flaps and elevator are moved to offset positions for best climb. The rudder may have a high percentage of coupling to the ailerons for easier towing. Lots of differential is used because the ailerons are already drooped.
- **Normal mode**. The wing controls are trimmed for minimum sink or best glide angle. Some differential is included, as is a small amount of rudder coupling. Camber control may be used to control the droop in the ailerons and flaps for slightly improved thermalling.
- **Speed mode**. The wing is commanded to have reflexed airfoils across its span for less drag at higher cruise speeds. Differential and rudder coupling are both disabled, as they are not needed. Elevator is coupled to camber for tighter turns. Flap motion matches ailerons 100 percent for faster roll rate. Higher control throws are also commanded.
- **Landing mode**. Glide-path control (airbrakes, butterfly, or crow) is enabled. With airbrake stick, ailerons rise and flaps drop, allowing steep precision landing approaches. An elevator delay function (if available) is used to control pitching when activated. Reverse differential (more down aileron than up, for improved roll control) is commanded,

since the ailerons are already raised. Rudder coupling may be added for landing.

SAILPLANE SETUP INSTRUCTIONS

Setting up a sailplane is not too difficult, but it helps to have a checklist so you don't forget to do anything. Here's a generic setup checklist for you sailplane fans:

1. Plug in servos. Be sure that all of your aileron, flap and tail servos are plugged into the proper receiver channels. Consult your system's manual for receiver output channels.
2. Enter the system's programming mode. Choose a free model memory and select a sailplane mode. *Caution:* as soon as you switch the model type, the data existing in the current model memory will be erased! (Other memories will not be affected.)
3. Transmission mode. Select the proper mode of transmission to match your receiver.
4. Turn on aileron—>flap mixing. Set 50 percent for starters.
5. Turn on aileron differential. Initially set 2:1 or 3:1 up- to down-travel ratio.
6. Turn on airbrake (butterfly/crow) glide-path control. Make sure flaps go down as much as possible. Ailerons should not go up more than 20 to 30 degrees. Turn on elevator delay and reverse differential if available.
7. Set all neutrals for the ailerons and flaps by using the wing beds (if they're foam wings) or matching up with the rest of the wing (be sure all trims are centered first). Don't use the airfoil molded into the fuselage, as these are often far from parallel from one side to the other. Set the elevator incidence per the manufacturer or plans, and the rudder should be centered.
8. Set up your desired launch presets using the LAUNCH menu. Fifteen to 25 degrees droop is all that's needed. A small amount of down-elevator may be needed for trim.
9. Set up any desired cruise settings with the SPEED menu. Not much reflex is needed; less than 1/16 inch is recommended.
10. Activate vee-tail (only if your model has one!).
11. Turn on flap—> aileron mixing, then set up your camber control. Limit motion to small amounts.
12. If your sailplane has spoilers, set them to work on the desired transmitter command. You may wish to combine them so they'll operate on the flap stick with butterfly/crow if you're using that function also.
13. If desired, add aileron-rudder coupling for coordinated turns. This setting is highly dependent on the model configuration and radio brand. Only a small amount of rudder is usually needed, especially if a large amount of differential is present, so start out with 10 to 15 percent. Carefully observe the direction of the fuselage relative to the thermal turn the model is making. If the nose points toward the inside of the circle, the coupling is too high; if it points toward the outside of the circle, you need more coupling. When everything is set properly, the fuselage will be tangent to the thermal turn circle.

Since this is a column on radios, you need to know which radios provide these functions. Actually, several currently available in the U.S.—the Airtronics* Stylus, Futaba 8U and 9Z and JR* 8103—provide almost all of the functions I have described. Some radios no longer in production also have these functions; these include the Ace Hobby* Micropro, the Airtronics Vision 8SP (which is really the standard against which all other sailplane radios are judged), the Futaba Super 7 UGF and JR's X-347 and X-388. The latter group is less expensive, yet any of them will do almost everything you need it to do for sailplanes. Unfortunately, at the time of this writing, none of the other manufacturers provide radios that handle the sailplane functions. Multiplex* recently started to import systems with sailplane functions into the U.S.

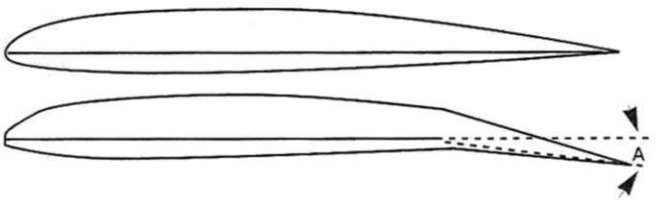


Figure 3. Camber is changed by raising or drooping the entire trailing edge of the wing. Limit the "A" dimension to less than 1/16 to 1/8 inch (1.5 to 3mm) for most airfoils.

I'd like to say more about sailplanes and radios, but there isn't enough room, so I'll come back to the topic in a future column. Remember, if you want to write to me, send your self-addressed, stamped envelope to Don Edberg, 4922-2Q Rochelle Ave, Irvine, CA 92604, or email me at dynamic3@flash.net. I get lots of mail, so please be patient!

**Addresses are listed alphabetically in the Index of Manufacturers on page 142.*

by GEORGE LEU

JETS AND THE TOLEDO SHOW

I love jets. They make excellent competition machines because they fly so well. Here is my 1996 Top Gun Team Scale entry BVM F-86 Sabre Jet "Putty Tat" being shown off by my pilot Dean Di Giorgio (left) and editor Gerry Yarrish.

JETS HAVE ALWAYS intrigued me as scale subjects because of the wide variety of kits available; that they fly like pattern ships is also a plus. While interest in ducted fans continues to grow, jet models aren't considered mainstream and probably will never be part of every modeler's inventory. This is too bad. If you haven't thought of a jet as a possible future project, maybe a little more information will help generate some interest.

DUCTED FANS 101

I love jets and have a fair number of them in my workshop. The power system is fairly simple and in principle, is the same for all ducted-fan models. The power system consists of an air inlet and duct, a fan unit, the engine/tuned pipe and a thrust tube. The fan unit is composed of an outer shroud, impeller blades and hub attached to the engine, and stator blades just behind the impeller. As the air is drawn into the inlet, guided through the impeller and then out through the thrust tube, the high-velocity air exiting the model generates the thrust.

Although all the parts of a ducted-fan model are important, the design of the impeller blades is most critical. The fan shroud helps direct the airflow rearward and prevents "tip losses," i.e., losses in efficiency caused by vortices generated at the impeller tips. The fixed stator blades at the rear of the unit straighten the swirling airflow from the impeller. If the impeller is too small for your engine or doesn't have enough pitch, the engine may exceed its maximum rpm limit. This may damage the engine, and the connecting rod usually fails when this happens.

Conversely, an impeller that doesn't reach peak rpm won't generate its rated thrust. Ducted-fan engines produce very high rpm and, when properly set up, do an excellent job powering jet models. Tuned pipes are the norm for these engines.

Over the years, several popular ducted-fan units have been developed, including the Bob Violett Models* Viojett, the Jet Model Products* Dynamax, the Jet Hangar Hobbies* Turbax and the Byron Originals* Byrojet. In the Byrojet, the engine, exhaust header and tuned pipe all sit in front of the fan unit, and this is called a "pusher" design.

Figure 1.
Typical "Tractor" ducted-fan setup

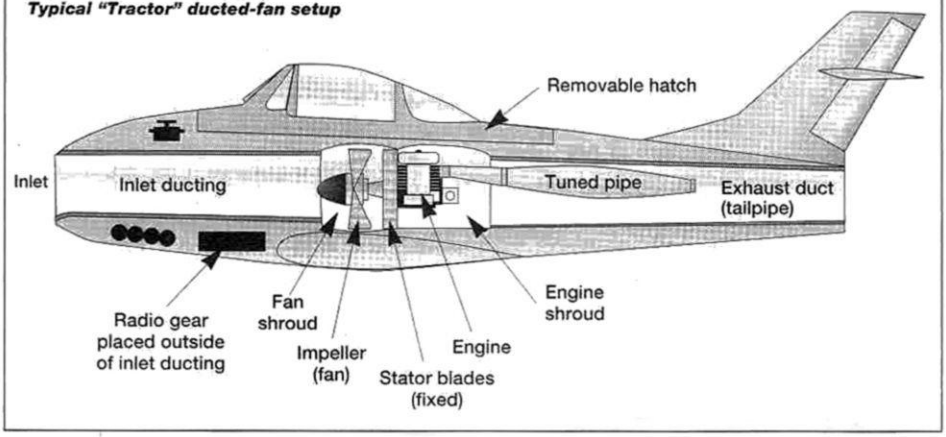
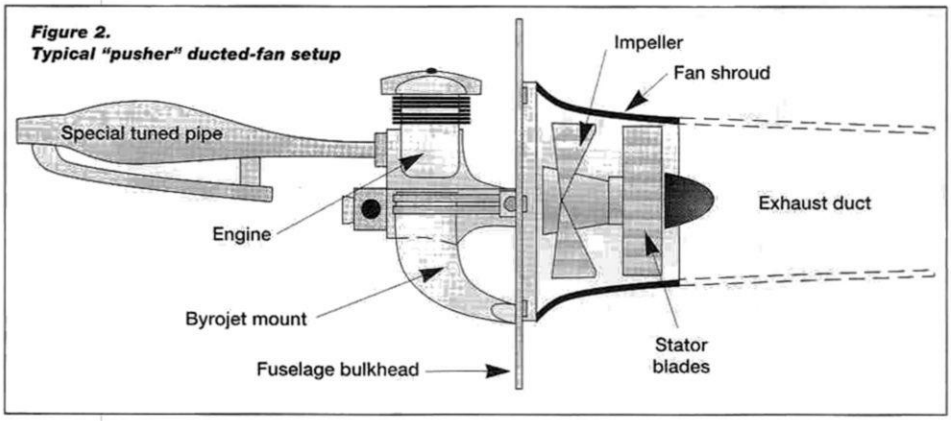


Figure 2.
Typical "pusher" ducted-fan setup



In the other units, the engines and exhaust systems are behind the fans, and this is called a "tractor" design.

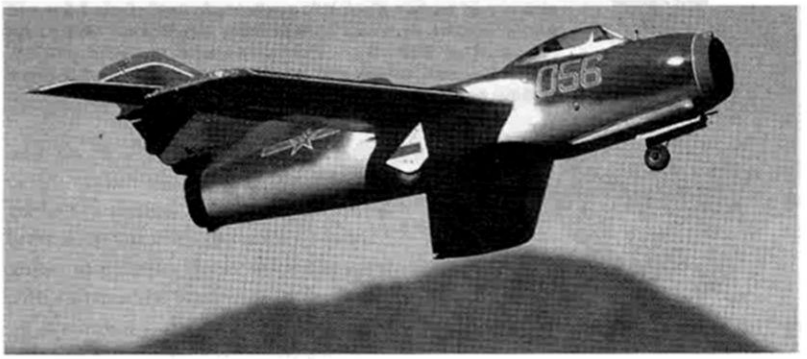
The idea behind a pusher design is that by keeping the airflow through the thrust tube undisturbed, more exhaust velocity is sent out as thrust. On the other hand, tractor setups rely on air flowing smoothly through an intake duct before it enters the fan unit to increase efficiency and thrust velocity. Various fiberglass fairings cover the engine and pipe in the Viojett, Turbax and Dynamax units to minimize air drag around the engine and exhaust components.

Planes designed around the Byrojet often don't have inlet ducting at all because the engine/header/pipe assembly is in front of the fan unit. Some Byrojet-powered models have auxiliary air intakes (cheater holes) on the underside of the fuselage to supplement the airflow into the impeller. The area of the 6-inch-diameter Byrojet is approximately 43 percent larger than the area of the 5-inch-diameter Turbax, Dynamax or Viojett units, and the Byrojet's takeoff acceleration is very good. If you fly from grass fields, the Byrojet will probably get your jet airborne faster. However, experience with the Byrojet shows that once you achieve about 135 to 150mph flight speed, your aircraft is hard-pressed to go much faster.

In contrast, well-designed, front-mounted inlet designs like those of the Dynamax, Turbax and Viojett units channel air smoothly into the fan, even at higher flight speeds. Though initial acceleration may be slow, once airborne, these units really excel. Like the inlets, the thrust tubes are made with very smooth internal surfaces to keep airflow velocity up and drag down as the air travels through the system. Typically, the diameter of the thrust tube tapers down to about 90 percent of the fan's diameter.

Keep in mind that ducted-fan technology is continually changing, and I have only scratched the surface here. Don't hesitate to contact these jet manufacturers for more information.

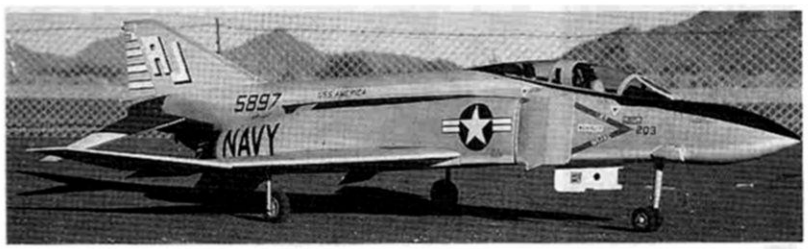
Top Gun Models showed their very popular MiG-29 as well as a new super scale version of the Fulcrum fighter.



Byron Originals has many jet models all powered by "pusher" Byrojet fan units. Here, a Byron MiG-15 does a slow fly-past at the Arizona Jet Rally. Note the cheater hole in the belly.

SCALE JETS

Jet models do very well at the Nats, Scale Masters Championship and the Top Gun Scale Invitational. Speaking from experience, I know jets have an advantage in competition. They fly like pattern ships as a result of high flight speeds and very little engine torque. The relatively small size of the impeller produces less torque than that of a model with a large propeller. There is no air blast from a prop over the elevator and rudder, so there is less control available until you increase airspeed. One hundred- to 200-foot takeoff runs are the norm for jets. One positive note is that jets usually go where they're pointed during takeoff, and the typical tricycle landing-



This F-4 Phantom is built from a Jet Hangar Hobbies kit and is powered by a Turbax fan unit. JHH models are excellent entries in the world of jet flight.

SCALE WINNERS

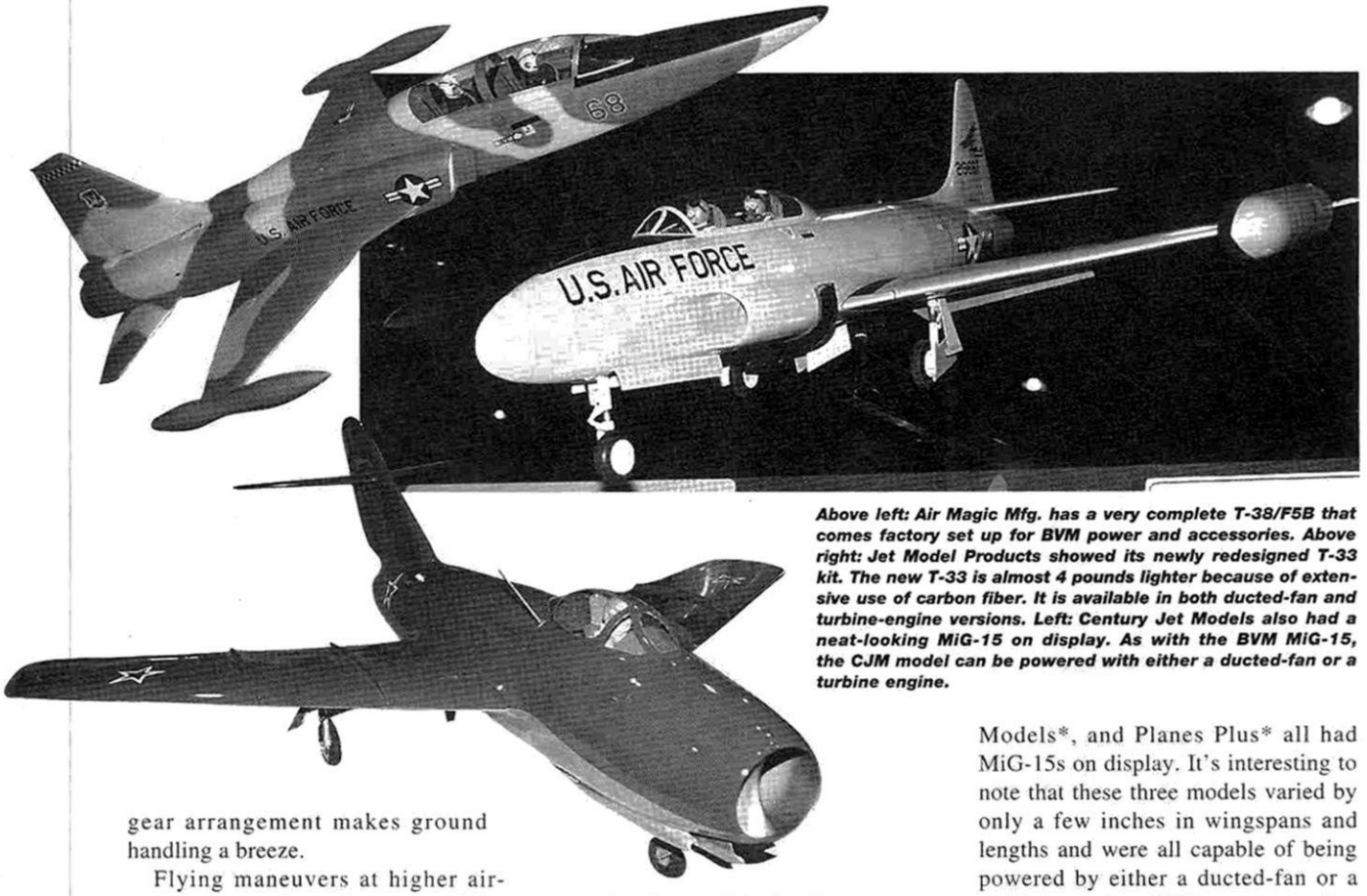
MILITARY SPORT SCALE
1 **Jim Sandquist** .....Beechcraft T-34 Mentor
2 **Ken Perkins** .....Curtis Sparrowhawk F9C
3 **Bob Kraus** .....P-38 Lightning

NON-MILITARY SPORT SCALE
1 **Mario Russo** .....Cessna Agwagon,
2 **Mariano Alfafara** ..Clipped Wing Cub
3 **Tom Augustine** ....Waco YKS-6

DESIGNER SCALE
1 **Dave Platt** .....T-28C Trojan
2 **Ken Perkins** .....Fairchild FC2W2
3 **Hal Parenti** .....Cessna 336

SCALE JET
1 **John Carlson** .....Boeing 757
2 **Jack Swint** .....F105 G Thunderchief
3 **Terry Holston**.....MiG-29 Fulcrum

BEST IN SHOW
Dave Platt .....T-28C Trojan



Above left: Air Magic Mfg. has a very complete T-38/F5B that comes factory set up for BVM power and accessories. Above right: Jet Model Products showed its newly redesigned T-33 kit. The new T-33 is almost 4 pounds lighter because of extensive use of carbon fiber. It is available in both ducted-fan and turbine-engine versions. Left: Century Jet Models also had a neat-looking MiG-15 on display. As with the BVM MiG-15, the CJM model can be powered with either a ducted-fan or a turbine engine.

gear arrangement makes ground handling a breeze.

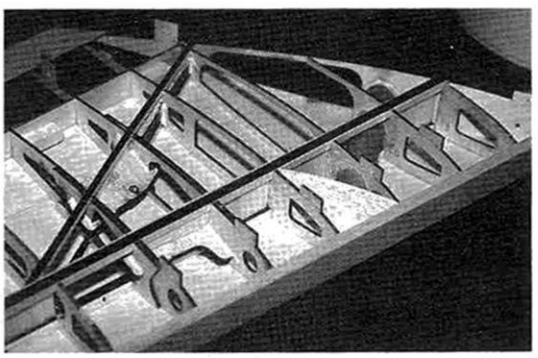
Flying maneuvers at higher airspeeds is another advantage. A jet doing a 170mph fly-past maneuver will cover 200 feet in only a few seconds. Compared to a WW I biplane, which will probably cover that distance in about 30 seconds, the jet simply experiences fewer corrections during its short time in the judging window.

Finally, I think jets have a bigger "wow" factor. With their engine/fan units completely hidden, most jets look as though they're going 100mph just sitting on the runway. This gives people (and judges) the impression of high speed, advanced technology and a higher skill level of the pilot. That is a great edge in competition. Just think about it; if you showed up at your local flying field with a jet, wouldn't you instantly have an audience of admirers just waiting for you to fly? If you want to find an edge in competition, a jet has a lot going for it.

MiGS AT TOLEDO

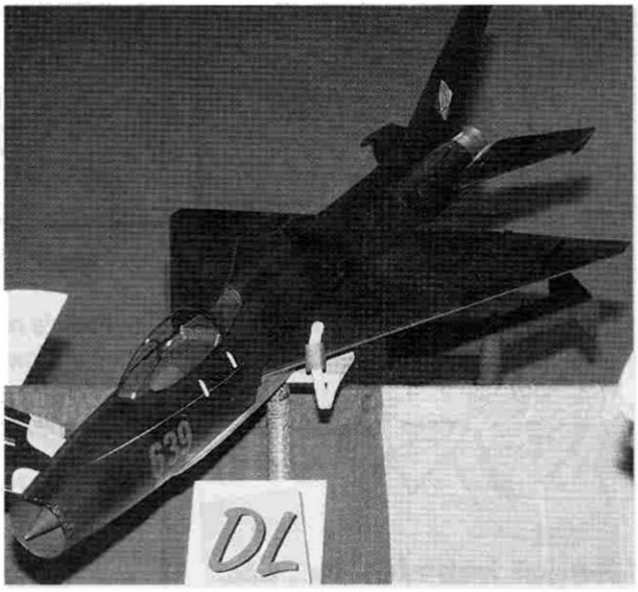
There were plenty of jets at the 1998 Weak Signals Toledo Hobby Expo, and I saw many interesting designs. Bob Violett Models, Century Jet Models*, and Planes Plus* all had MiG-15s on display. It's interesting to note that these three models varied by only a few inches in wingspans and lengths and were all capable of being powered by either a ducted-fan or a turbine engine. With a swept-wing planform, an abundance of available documentation and large size, I think any of these MiG-15s would make an ideal competition machine. They should be just as popular as F-86s are and would make natural dogfight challengers for the Sabre Jet.

Top Gun Aircraft* showed the new super scale version of its MiG-29 Fulcrum. For years, the Top Gun MiG-29 was available with a Byrojet power system and separate elevators in place of the scale flying stab and fixed rudders. I always thought these



Bob Violett Models had its impressive new MiG-15 on display at the Toledo show. The MiG is of typical BVM quality and features a laser-cut wooden wing structure.

Craig Aviation now offers the popular George Miller designs formerly from Custom R/C Aircraft. Shown here is the YF-22. I competed with this design, and it performs beautifully.



D.L. Aeromodeles showed off a new MiG-21 Fishbed that should be available by the time you read this column.

features made it a good beginners' design. The new version, with all the correct scale features, including functional rudders, a fully detailed cockpit, scale landing gear and power from a Dynamax power system (including inlet ducting), makes this model a real showstopper. In fact, Terry Holston finished third in the Scale Jet category at the show with his new Top Gun MiG-29.

Another MiG that caught my eye was a MiG-21 from D.L. Aeromodeles*. This 1/6.5-scale model is 85 inches long and has a wingspan of 45 inches. According to D.L. Aeromodeles owner, Yves Duchesneau, this sleek-looking model has flown well during its initial tests, and the kit should be available by the time you read this.

MORE JETS

If a T-38 or an F-5B interests you, Air Magic Mfg.* and Craig Aviation have kits of these aircraft. The Air Magic models employ jig-molded, state-of-the-art epoxy/glass parts and come with factory-installed main gear plates, intake ducting and engine mounts for the Viojett system. These are really high-tech aircraft.

Craig Aviation purchased the molds and design rights for the Custom R/C Aircraft models designed by George Miller. I'm quite familiar with the Miller T-38 and YF-22, having reviewed them and competed with them at scale events for several years. Both are great flyers. The T-38 is especially easy to fly despite its very small wings. I powered both models with Byrojets, but Craig Aviation designed intake ducting as an option for those who wish to fly with Dynamax systems.

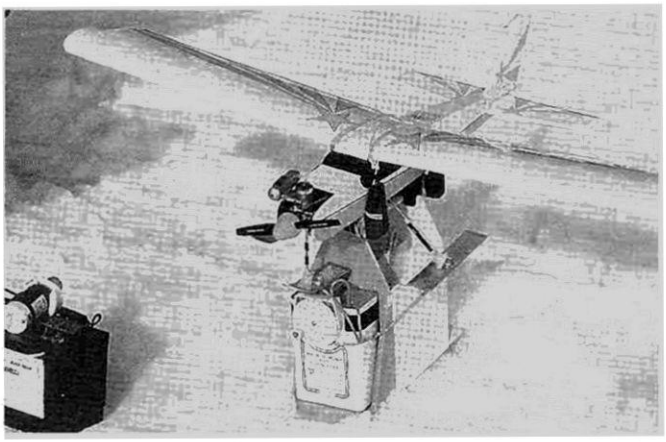
Well, that's about it for the jet stuff at Toledo; there was, of course, much more there for the scale modeler. I include a list of the Toledo Scale winners and hope to get more information on these models for future columns. Stay tuned.

**Addresses are listed alphabetically in the Index of Manufacturers on page 142.*

by GEORGE WILSON JR.

SKI AND FLOAT LANDING GEAR

IN THE JUNE 1998 issue of *Model Airplane News* (page 92), I starting talking about basic landing-gear layout. This time out, I'd like to finish the discussion by covering the rudiments of skis and floats. These types of landing gear extend your flying to the lake and the winter—including frozen lakes.



This is Joel Chappell's PT-40 on Du-Bro* "tricycle" aluminum skis. The front ski is used for steering just as a nose wheel would be. The tail-dragger arrangement with skis also works well.

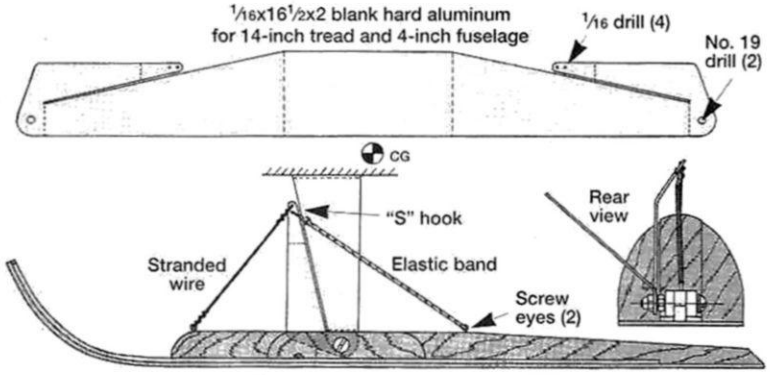


Figure 1.
A typical ski-rigging system that works well for gears with a nose ski or a "two point" ski setup that uses neither a nose nor tail ski. If your gear uses a tail ski, the wire and elastic band positions should be reversed.

Twin floats and skis may be substituted for wheeled landing gear with great results. Contrary to what you may have been told, when properly installed, well-designed floats and skis require little (if any) added engine power. Bear in mind that most land planes are overpowered for aerobatic capability, and that seaplanes and ski planes are not intended to do aerobatics.

Landing gear works most effectively when it makes the airplane act as a balanced seesaw. When flying speed has been reached, the airplane rotates about the landing gear axle to achieve an angle of maximum lift. Landing gear (including skis) have to be unbalanced enough to ensure that the nose wheel or tailwheel stays solidly on the ground when the plane is at rest, and in the case of a tail-dragger, it has to be unbalanced enough to minimize nosing over during taxiing. Seaplanes should be balanced so that the step of the float(s) is directly below the CG, and takeoff rotation occurs at or about the step with minimum effort.

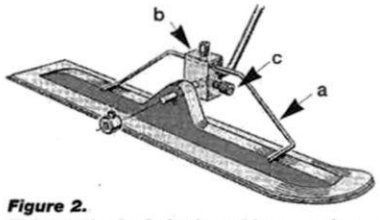
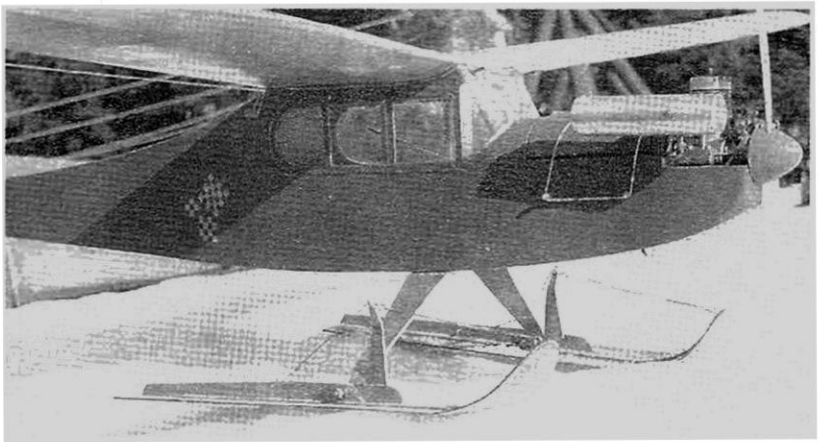


Figure 2.
This method of rigging skis was shown in "Hints & Kinks" several months ago. The ski is set to the desired in-flight angle using an 1/8-inch, music-wire spring (a) that is retained in an aluminum block (b) by a 4-40 setscrew. Adjust the in-flight angle with the 6-32 setscrew (c) on the axle. Chris Duncan submitted this method and pointed out that it is much neater than wires and bands. (Illustration by Jim Newman.)



An example of "two point skis" (no nose or tail ski required). This type of setup depends on the air rudder for ground steering. However, the air rudder can be very effective on slippery surfaces.

SKI PLANES

Skis can be set up like land gear, with either a steerable nose or a tail ski, and will work quite well. The most serious deterrent to flying with skis—other than the cold weather—is footprints in the snow. A plowed area or, better still, a frozen lake surface make good places to fly from.

Conventional skis set up with nose or tail skis follow the same rules for placement as their wheeled equivalents. They should be large enough to even out the surface irregularities. The larger the skis, the more easily they can bridge unevenness in the snow. For the bottom surface of the skis, a

good, hard finish such as polyurethane is recommended. To lessen friction, you can also use alpine ski wax on the bottoms of your model's skis.

Skis should be "rigged" so they remain tilted upward somewhat at their front ends while in flight. This helps prevent them from digging in when the model lands. This is usually done with a spring or rubber band that pulls up the front of the ski. A cord attached to the rear of the ski limits the amount of tilt. During takeoff, the rigging of the skis must allow the model to rotate to allow the wing to achieve the proper angle of attack for takeoff. During flight, the positive ski angle should be small enough to minimize drag but large enough to prevent the tips from catching during landing.

CONSTRUCTION

Skis may be made from 1/8-inch aircraft plywood with a hardwood top center piece to improve rigidity. The top center piece is also used to connect the ski to the landing gear axle. The front of the skis should be generously curved upward to help them navigate over rough snow. This curvature is usually made by soaking the plywood in water and then clamping them into a wooden mold. Metal (usually aluminum) may also be used to make skis. To promote straight taxiing and minimize side motion, a thin keel (usually a narrow strip of hardwood or plywood) can be added to the bottom centerline of the skis.

On smooth, crusted-over snow and on ice, the ease with which a ski-equipped model can weathervane into the wind takes some getting used to. Steer the model in the direction you want to go, even if its nose is not pointed that way. As usual, taking off and landing into the wind make the weathervaning problem go away.

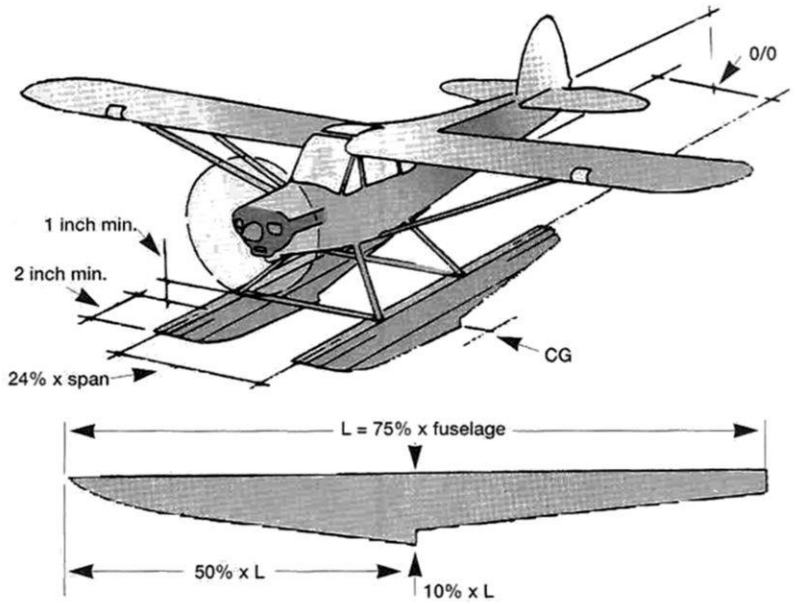
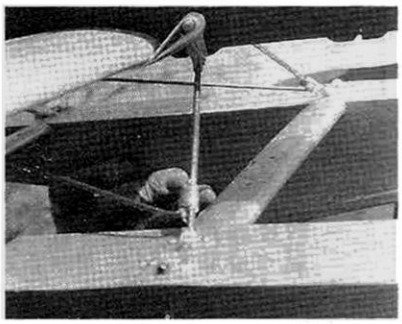


Figure 3. The general arrangement of floats installed on a land plane. Note that the tops of the floats are parallel to the fuselage's reference line. Rotation for maximum takeoff lift is governed by the float height at the step and the after body's bottom angle.

SEAPLANES

The basic design requirements for floatplanes and flying boats are the same. They both have the advantage over land planes of having their takeoff rotation points (tip of the step) directly under their CG balance points. As can be seen in the drawings, the float or hull bottom tapers upward both forward and aft from the step. The rear taper must be enough to allow the wing to achieve its proper angle of attack for takeoff when the model is running on the step. The forward taper assists the model to "get on step" during takeoff. In most cases, ground landing gear and floats can easily be interchanged.



Floats should be rigidly mounted. This one has "N" struts on each side and strong pine cross struts.

Flying boats have distinct advantages. First, they deflect the water outward and away from the propeller—assuming they have a single engine. Second, they have ample room to make watertight compartments for your equipment. With most flying boat designs, the wing is close to the water and the airplane is less susceptible to crosswinds, which makes water handling easier. Given a choice, flying boats get my vote every time because of their better landing and takeoff characteristics.

SIZE

Floats must be large enough to adequately support the model at rest. The rule of thumb is:

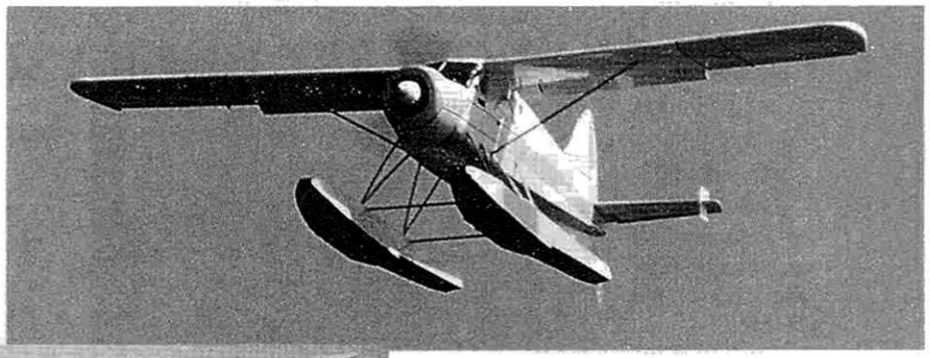
Float length =
75 percent of the fuselage length.

Float height (at the step) =
10 percent of float length.

Float width (at the step) =
float height at the step.

Joel Chappell's Headmaster Sport 40 on Northeast Aerodynamics'* flat-bottom floats. Most trainers make great floatplanes. Note the simple conversion from tricycle land gear.

Ideally, at rest, the nose of the float should be out of the water, and the bottoms of the aft ends should be just about at water level. Flat-bottom floats are easier to build and have increased volume, and that increases their ability to support the model. The rules for flying boats are similar; they must be large enough to handily support the model's weight. Flat bottoms and ample width are helpful features.



Harry Newman's de Havilland Beaver on landing approach; a great floatplane. Note the deployed flaps being used during approach.

Scale floatplanes are very popular. Here is Fred Tuxworth's OL-6 Loening Duck that has functioning amphibian gear. It taxies into the water, retracts the wheels and flies away. To land, it reverses the procedure and taxies back up onto the beach.

CONSTRUCTION

Hulls and floats can be built from balsa/ply, fiberglass, or glass-covered foam. Rather than trying to design your first set of floats (or flying boat), start by building a proven design. Dave Windom's float design in the August 1994 issue of *Model Airplane News* is recommended. The article's title tells it all: "Make Rugged Foam and Fiberglass Floats." There are also many float sets available in kit form. My favorites are those produced by Kircher R/C Products Inc.*

In any case, floats should have strong fore-bottoms to withstand beaching or striking hard objects, and their chine edges should be sharp to direct the water sideways. A fiberglass finish is recommended. I have tried many bottom shapes: V-shaped, inverted "V" (viper), curved and flat; they all work well. But, flat bottoms are hard to beat for ease of construction and performance.

WATER RUDDERS

These are most important. Much of the fun of water flying is being able to taxi into the wind for takeoff and then back to the beach when you are done. Occasionally, you will hear someone say his model doesn't need a water rudder. If you watch him fly, you will find he doesn't do much taxiing. Most often, the model is released at full throttle and is airborne very quickly.

Cubs love to be seaplanes. Here is Sonny Martel's 1/4-scale Cub settling in at the Southern NH Flying Eagles seaplane meet.

Water rudders are linked to the air rudder, and when the model rises on the step, the water rudders sometimes come out of the water; this is when the air rudder becomes effective. Rudders mounted on a piece of music wire extending from the air rudder hinge line appear flimsy but they are very effective and easy to construct.

The spread between the floats should be about 25 percent of the wingspan to minimize tipping tendency when the wind lifts a wingtip or during tight turns while taxiing. Most flying boats have wingtip floats to minimize tipping.

Mounting struts for floats should be rigid. Struts should be X-braced lengthwise and similarly cross-braced, if possible. Struts between the floats are also recommended to increase rigidity. Floppy floats resist getting up on the step.

Floats should be mounted so they cause minimum drag in the air. Their top surfaces should be slightly negative. However, if they are poorly designed and you can not get enough rotation for easy takeoff, they may be shimmed to give the wing a more positive angle; this usually solves takeoff problems.

**Addresses are listed alphabetically in the Index of Manufacturers on page 142.*

SCRATCH-BUILDING NOTE

Balsa sheets often must have their edges straightened. This can be done using a metal straightedge and a sharp blade. Sig* makes straightedges, or try a sheet-metal shop; ask for pieces of scrap aluminum. I drill pinholes in my straightedge and then pin it and the sheet down to ensure that they do not move while the edge cut is being made.

A bench saw may also be used. Make (or find in your scrap box) a piece of pine or balsa sheet about an 1/8 inch thick with a straight edge. Pin this piece to one edge of the sheet to be straightened and allow it to overlap about 1/8 inch. Now, run the piece and the sheet through the saw with the straightedge against the rip fence. Remove the extra sheet, turn the sheet over and run the opposite side through the saw to make it straight and parallel.

LATEST PRODUCT RELEASES

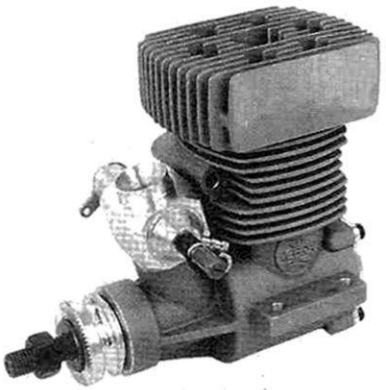
BALSA USA

1/4-Scale J-3 Cub

This redesigned kit features full-size, rolled plans and photo-illustrated instruction booklet, easier construction and an extensive hardware package. It comes with an ABS cowl, prebent landing gear and a decal set. Specifications: wingspan —108 inches; length—68 inches; wing area—1,610 square inches; weight—12 to 14 pounds; engine required— .60 to 1.08 2-stroke or .91 to 1.20 4-stroke.

Kit no.—438; **price**—$156.95.

Balsa USA, P.O. Box 164, Marinette, WI 54143; (906) 863-6421, fax (906) 863-5878.



WEBRA

P-5 .60 Heli Engine

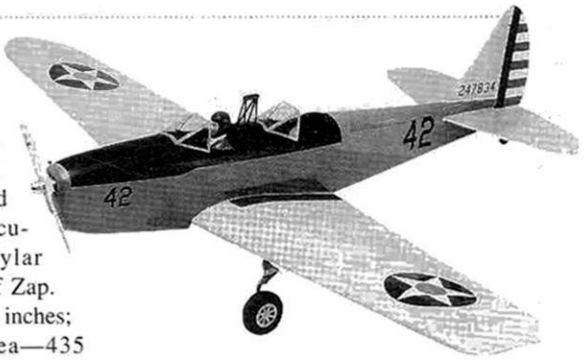
With four intake and one exhaust port, this new helicopter engine offers enhanced performance. It also features a new one-piece crankcase and machined aluminum backplate with an O-ring seal; a 9.5mm bore Pro-Mix carburetor with an extended aluminum throttle arm; a ringed aluminum piston; and a honed steel sleeve.

Part no.—WEBE680; **price**—$279.95.

Webra; distributed by Horizon Hobby Distributors Inc., 4105 Fieldstone Rd., Champaign, IL 61821; (217) 355-9511; website: www.horizonhobby.com.

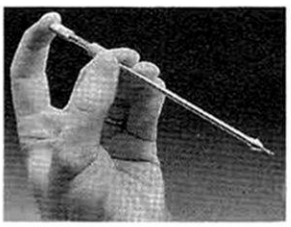
HOUSE OF BALSA INC.

PT-19



This all balsa and ply PT-19 kit comes with full-size rolled plans, solid machined balsa tail feathers, a photo-illustrated instruction manual, scale documentation, self-adhesive Mylar decals and a 1-ounce bottle of Zap. Specifications: wingspan—50.5 inches; length—40 inches; wing area—435 square inches; weight—3.5 to 4 pounds; engine required—.25 to .30 2-stroke or .28 to .40 4-stroke; radio required—4-channel.

House of Balsa Inc., 10101 Yucca Rd., Adelanto, CA 92301; (760) 246-6462; email hobandzap@aol.com.



GREAT PLANES MODEL MFG.

Dead Center Engine Mount Hole Locator

This handy, all-metal tool takes the guesswork out of marking the proper position of holes to be drilled. It's easy to use; just place the engine on the mount, insert the self-centering cone into the mounting hole and twist the tool's knurled grip several times. A drill bit that protrudes from the cone creates a small starter hole. The Locator's length and small diameter make it easy to reach tight places like in-cowl installations.

Part no.—GPMR8130; **price**—$11.99.

Great Planes Model Mfg., 2904 Research Rd., Champaign, IL 61826-9021; (217) 398-6300, fax (217) 398-0008.

WENDELL HOSTETLER'S PLANS

Cessna 421C Twin

Rolled plans for a 24-percent-scale (118-inch-span) and 27-percent-scale (133.25-inch-span) Cessna 421C are now available. The plans are for a wet-wing (no tip tanks) version of the 421C, but the model can be built with tip tanks, and the plans include those details. Kits and accessories, including custom retracts, are also available. A 3-view and full-scale specifications are included on the plans.

Prices—$46.50 (24% scale), $54.50 (27% scale).

Wendell Hostetler's Plans, 1041 Heatherwood Ln., Orrville, OH 44667; (330) 682-8896, fax (330) 683-5357.

DYNAFLITE

Fun Scale Piper Super Cub

This sport-scale kit features conventional construction techniques and two-piece, D-tube detachable wings. Specifications: wingspan—104 inches; length—67.25 inches; wing area—1,571 square inches; weight—15 to 17 pounds; engine required—1.60 4-stroke or 25cc to 35cc gasoline; radio required—4- to 6-channel with six to eight servos.

Part no.—DYFA3025; **price**—$279.99.

Dynaflite; distributed by Great Planes Model Mfg., 2904 Research Rd., Champaign, IL 61826-9021; (217) 398-6300, fax (217) 398-0008; website: www.dynaflite.com.

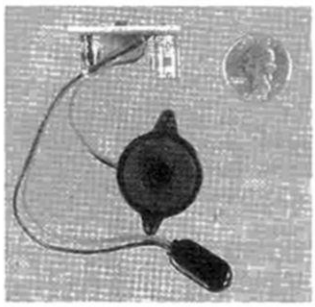
DUMAS PRODUCTS INC.

Stinson Reliant SR-10

This 30-inch-span rubber-powered model features over 80 laser-cut parts and comes with decals, a 9-inch propeller, rubber, vacuum-molded parts and lightweight, colored tissue. Call Dumas for a complete information packet on their entire line of aircraft.

Kit no.—301; **price**—$36.95.

Dumas Products Inc., 909 E. 17th St., Tucson, AZ 85719; (800) 458-2828, (520) 623-3742, fax (520) 620-1329; email: dumas@azstarnet.com.



SIBROM TECHNOLOGIES INC.

MDC-T Sonic Locators

These devices were designed to help you find your crashed airplane by generating audible sonic pulses 15 or 26 minutes after being armed. If the flight is uneventful, just land before the 15 or 26 minutes are up and disarm the device. If you crash, the sound will continue for hours until you find the model and turn the locator off. The MDC-T15 and T-26 come with 9V battery clips and can be connected directly to a flight pack.

Part nos.—MDC-T15, MDC-T26; **price**—$20.95 (plus $4 S&H).

Sibrom Technologies Inc., P.O. Box 668, North Haven, CT 06473; (800) 528-1197; website: www.sibrom.com.

AMR PRODUCTIONS

Warbirds over Pennsylvania '97

Modelers and spectators came from 10 states to watch the second largest warbird meet on the East Coast, and this two-hour video covers it all. Featured models include a Marine twin transport R4D and a twin ducted-fan combat Phantom.

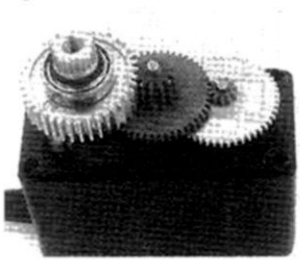
Price—$19.95 (plus $3 S&H).

AMR Productions, P.O. Box 1813, Toms River, NJ 08754; (609) 971-8338.

JR REMOTE CONTROL

2721 Ultra Torque Alloy Servo

This new servo features the same powerful coreless motor and amplifier of the 4721 servo with a new gear train with hard-anodized aluminum output gear and brass and hardened steel counter gears. Output torque is 116 oz.-in., and it has a 60-degree transit time of .18 second. The 2721 is 3/16 inch shorter than the 4721, and it's even lighter than the 4721.



Part no.—JRPS2721; **price**—$139.95.

JR; distributed by Horizon Hobby Distributors Inc., 4105 Fieldstone Rd., Champaign, IL 61821; (217) 355-9511; website: www.horizonhobby.com.

CLASSIFIEDS

BUSINESS

WWW.COPTERCORNER.COM, a full-service R/C helicopter site since 1978. Email: helifly@best.com. [8/98]

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GIANT-SCALE PLANS BY HOSTETLER: catalog $2 (plus SASE) to Hostetler's Plans, 1041 Heatherwood B, Orrville, OH 44667; phone (330) 682-8896; www.aero-sports.com/whplans. Our plans now available in any size. [7/98]

SODA-CAN AIRPLANES—replica biplane detail plans with photos, $7.50 PPD. Early's Craft, 15069 Valley Blvd. SP 26, Fontana, CA 92335. [8/98]

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RACERS: "BULLDOG," GEE BEEs, others. Many sizes. PLANS catalog/newsletter, $4. Vern Clements, 308 Palo Alto, Caldwell, ID 83605; (208) 459-7608. [10/98]

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HOBBYIST

WANTED: old, unbuilt, plastic model kits from '50s and'60s. Send list, price to Models, Box 863, Wyandette, MI 48192. [3/99]

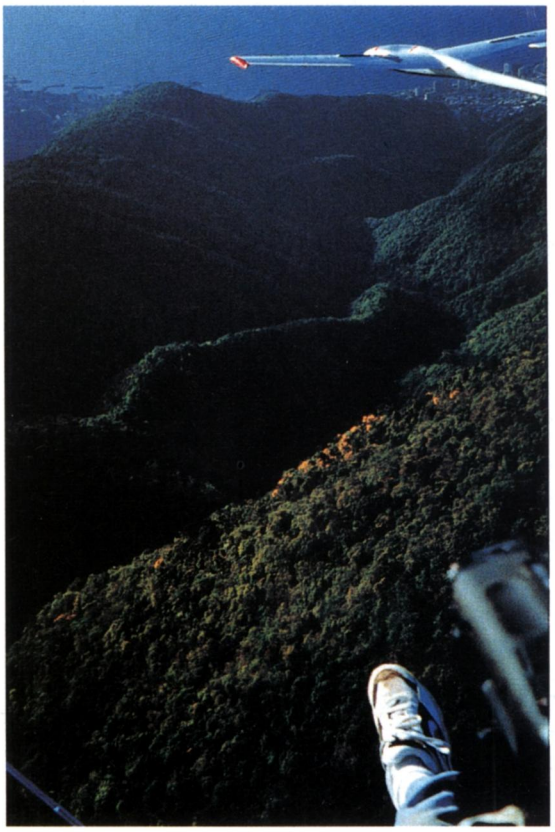
WANTED: sports aviation EZ Pinto. H. Johnson, Box 285, Bountiful, UT 84011. [11/98]

MAGAZINE BACK ISSUES—American Modeler, American Aircraft Modeler, Aeromodeller, Model Airplane News, Model Aircraft, RCM and more; 1930s to 1990s. For list, send SASE to Carolyn Gierke, 1276 Ransom Rd., Lancaster, NY 14086. [12/98]

ATTIC CLEANING: Byron Hellcat, complete w/purr pow'r 4.2, $1150, yellow Zero, retracts and wheels (NIB), $449. Many Sig, Great Planes, Balsa USA available; engines: all NIB, Saito 130 DP, $290, G38 w/ignition, $275; Brison 2.0 w/ignition, $195; Ys-91, 53, 120, ST 4500, 2500, 90R, 51R, 45ABC, 34R, Thunder 54, 91, O.S. 46, 52, 108; 70, 32FABC. Many more available. Write or call for list. Mark L. Finn, 382 Prospect St., Torrington, CT 06790; (860) 482-3032, after 6 p.m.; leave message. [8/98]

WANTED: Squadron/Signal Modern Military Aircraft book titled "Thud," by Lou Drendel. Raymond Leone, 219 North Jefferson, Battavia, IL 60510. [8/98]

IN-FLIGHT FLYING



PHOTOS BY CLAUDIO MARCOTULLI

HAVE YOU EVER WONDERED what it would be like to soar through the air alongside your R/C model? Venezuelan Claudio Marcotulli, an R/C builder, flyer and paraglider pilot, found out when he flew his El Chuti sailplane from the top of El Avila mountain (on the coast near Caracas) to its base while gliding down the 6,000-foot-high mountain himself.

To fulfill this goal, Claudio first needed to design and build a model with special features that would compensate for the performance differences between R/C sailplanes and full-size paragliders. After two years of building during college breaks, the result was El Chuti—a foam-fuselage model sheeted with balsa and reinforced with fiberglass, with a 155-inch-span foam wing sheeted with Obechi. Because a paraglider has a lower cruise speed and a higher rate of descent than an ordinary R/C sailplane, Claudio added spoilers and flaps to his design. On its first test-flight, the 18-pound El Chuti outperformed Claudio's expectations: "After taking off, the plane was floating like a feather; then I thought the effort had been worthwhile."

Claudio then organized a flight team of two paraglider pilots, another model airplane pilot, two photographers and a coordinator, along with two tandem paragliders courtesy of a local free-flight school. Although the flight down El Avila was twice postponed because of adverse weather, the conditions were nearly perfect for the third attempt, and Claudio, his copilot and another pilot, a cameraman and one coordinator gathered on the mountaintop.

The first paraglider, carrying the pilot and a cameraman, took to the sky while Claudio checked his radio equipment and El Chuti. Soon after, Claudio and his copilot took off; when both paragliders were stabilized, the coordinator launched El Chuti down the mountain and Claudio took control of the model. With its spoilers in and its flaps up, the model performed even better than the paraglider. Claudio says, "[I had] the illusion of having a motor-powered glider. Pushing the throttle stick on my radio control (cleaning the wing) would make the airplane go up in relation to my [movement] in the paraglider. Einstein's relativity theory immediately came to mind. In truth, both were actually descending." Claudio also comments that it was unusual to be able to fly an R/C plane beneath his feet. "I could even touch it when we were flying at the same speed."

Even though the flight down El Avila went flawlessly, the problem of landing all three craft unharmed still posed a problem. Claudio had targeted a golf course for landing, and if the weather changed for the worse or another emergency situation arose, El Chuti would be flown out to sea. Three minutes before landing, Claudio turned off his transmitter, and on the golf course, a pilot with a radio of the same frequency took temporary control of the model while Claudio and his copilot landed. Once safely on the ground, Claudio regained control and gently brought El Chuti in for a grass landing.

Reflecting on his unique flying experience, Claudio says, "Paragliding, you experience your surroundings intensely: you can feel the wind on your skin, smell the clouds, and see the world from above. Controlling an R/C airplane, you feel the movements of the craft vicariously .... [This adventure] has led me to believe that flying is more than being capable of moving in the air; it is a personal experience that comes from a voyage through our inner world."

—Debra Sharp